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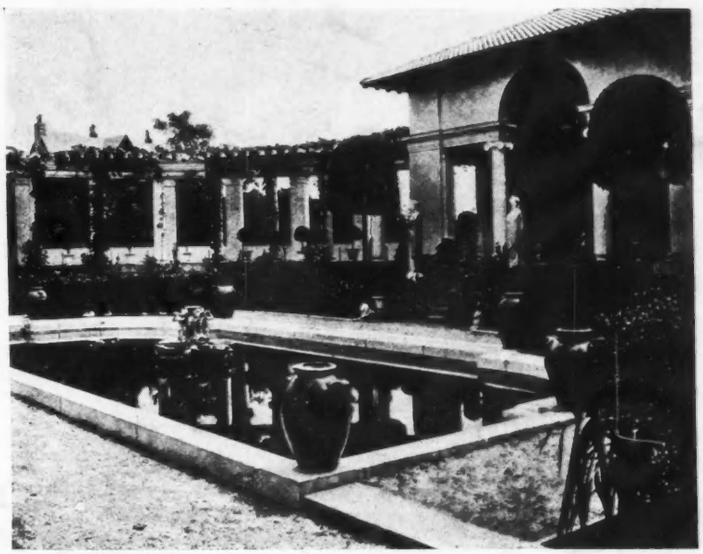

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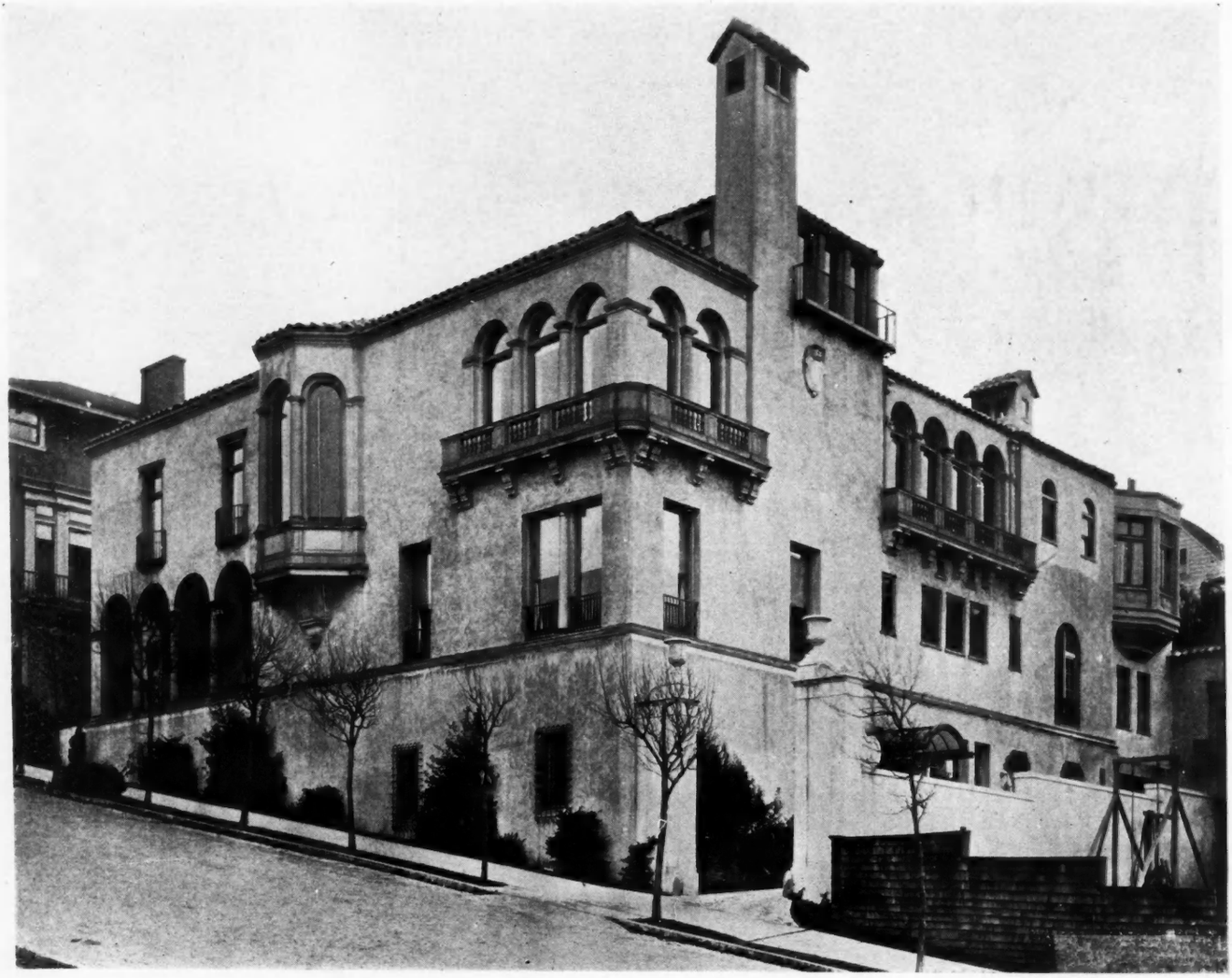

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The BUILDING REVIEW

VOL. XIX SAN FRANCISCO, FEBRUARY, 1920 No. 2

J. A. DRUMMOND
PUBLISHER

HARRIS ALLEN
EDITOR

Cover—Pool at Faulkner Farm — Chas. A. Platt, Architect

THE ARCHITECT

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The BUILDING REVIEW

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The ARCHITECT

ARCHITECTURE IN THE UNITED STATES ONE HUNDRED YEARS AGO

By HARRIS ALLEN

IN 1833 there was published in Massachusetts a book entitled "Practice of Architecture," by Asher Benjamin, architect, author of "The American Builders' Companion," "The Rudiments of Architecture," and "The Practical House Carpenter." This book was intended for the use of "Carpenters and Practical Men," and was undoubtedly the inspiration and guide to much of the delightful work of those days, in which New England abounds, and for which a belated appreciation has steadily increased.

Couched in quaint terms, but clear and logical, the refined taste and common sense of this veteran architect and builder, whose experience of many years' study and practice illuminates his pages, are well worth our interested attention. He deals with practical geometry and carpentry, with the five orders and an additional column and entablature of his own assembling, with mouldings, details and ornaments. His object is best expressed in his own preface:

"I have endeavored, in this treatise, to avoid a defect which is very generally complained of in books of this kind: that is, want of a particularity in the details, and of a clear, simple explanation of them. In cities, where architects are always at hand, this deficiency is not so much felt, since the carpenters there stand in need of no further knowledge upon the subject than such as may enable them to put into practice the drawings furnished by the architect. But, in villages, the case is different. Those carpenters in country villages who aspire to eminence in their business, having no architect to consult, are under the necessity of studying the science thoroughly and without a master. To them, therefore, is this book peculiarly adapted; for it contains the principles of many expensive folios, condensed into a narrow space and applied to modern practice.

"The time has been, within my own recollection, when New England did not contain a single professed architect. The first individual who laid claim to that character was Charles Bulfinch, Esq., of this city, to whose classical taste we are indebted for many fine buildings. The construction of the Franklin Street houses, of which that gentleman was the architect, gave the first impulse to good taste; and architecture in this part of the country has advanced with an accelerated progress ever since. But though architecture has certainly improved, and rapidly too, within late years, a large proportion of the vast number of buildings which meet the eye, of all classes and sizes, and constructed for all purposes, are totally destitute of architectural taste. This defect does not arise from parsimony, for it is not uncommon to see buildings of large dimensions burdened with a profusion of expensive and misplaced finery, which forms anything but ornament. Buildings of this class, which under skillful hands might have become proud monuments of public taste, are mortifying and repulsive objects to those who take an interest in the science of architecture.

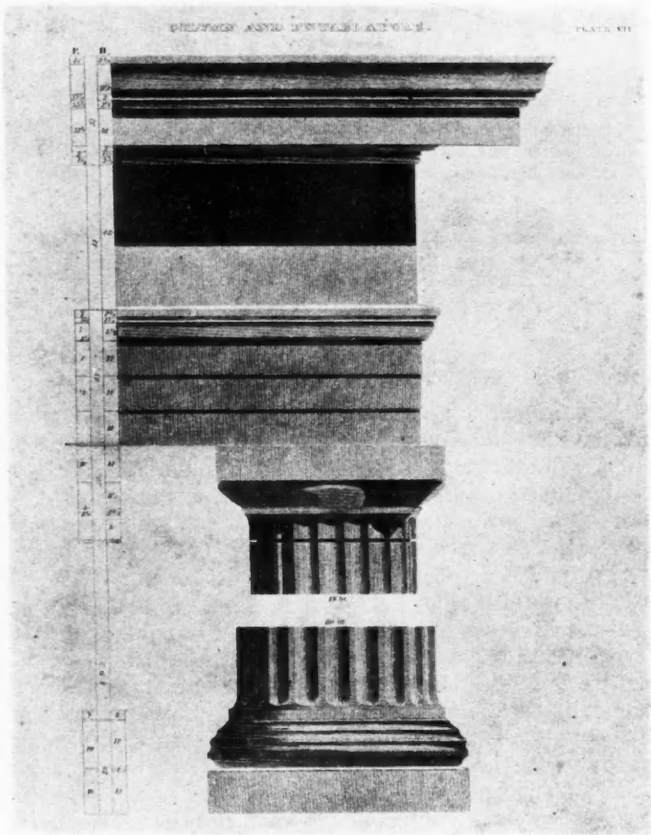
"It has been too prevalent a habit, among those who would not think themselves capable of instructing a carpenter in the art of planing or sawing boards, or a bricklayer in laying bricks, to undertake the much more difficult task of becoming their own architect. The consequence is that such persons proceed to build without any fixed system; unlooked-for difficulties are soon encountered, which lead to expensive alterations, and the harmony of the building is destroyed. Nor is this evil confined to private buildings. The committee selected to superintend our public edifices are apt to cramp the invention of the architect by their economy, or pervert it by their fancies, so that specimens of the taste of some member of the committee can usually be discerned by a skillful eye, among our most scientific compositions. But the evil is certainly decreasing. Knowledge of the science is rapidly gaining ground, and the increased attention attracted towards the subject disposes those who have not the necessary information to confide in those who have.

"The principles and practice of the science are developed in the following pages, in a detailed and systematic manner. The text is taken from the Grecian system, which is now universally adopted by the first professors of the art, both in Europe and America; and whose economical plan, and plain massive features, are peculiarly adapted to the republican habits of this country.

"I have given examples of each of the five orders of architecture; first in the usual way, then repeating their details upon a large scale. There are likewise added a column and entablature, selected from the Grecian antiquities, and standing, with regard to expense, between the Tuscan and Doric orders.

"I have also given six samples of frontispieces and porticos, with their details drawn on a large scale.

"To these are subjoined explanations and practical observations on their proportions and adaptation to the buildings in which they are to be used: also, a variety of examples of cornices, for both external and internal finishings and of architraves and base mouldings, accurately drawn one-half of the full size for practice, and accompanied with practical observations on their size and fitness; examples of doors, windows, and their decorations; ornamental mouldings, stairs, and carpentry; together with all the elements of architecture which are necessary



"A COLUMN AND ENTABLATURE"

to supply the wants of the practical builder. To these are added a complete drawing of a church, with all its details laid down in imitation of working drawings, with suitable explanations."

His comment on the use of mouldings might well be put on the wall of any drafting room:

"Mouldings, judiciously intermixed with plain surfaces, such as fillets, facies, coronas, etc., are the elements to which architecture is indebted for its most splendid productions. It is on the size, shape and fitness of these details, together with that of the plain surfaces which serve to divide and enrich them, that the beauty or deformity of every production, composed of these elements, depends.

"Anyone who is desirous of making himself a judge of these details must study the outline separately and critically, when affected by shadow, and when by reflecting light. After he has accustomed his eye to discern and retain the beauties and fitness of each for all the different situations in which he may wish to employ them, he will then as faithfully study the size, shape and fitness of all plain surfaces by which the mouldings may be separated and adorned. After this, he must study them collectively, by frequently drawing and intermixing their details; and he will thus be able to discern the good and bad effects of his composition, and improve his taste. Every composition is not only dependent upon the outline of its details but upon the proportion which the size of one bears to that of another and to the whole, and upon its adaptation to its intended place."

The major portion of the book deals with the orders, and there is much quotable material. His preliminary remarks lead one to believe that the carpenters of that time were supposed to know much besides carpentry: "Each of these orders presents a distinct type or mode of building, having a character peculiar to itself. The orders are the alphabet of the art; and to them and their elements, altered, varied and arranged in a thousand different ways, we are to look for the most splendid productions of architecture. A thorough knowledge of these orders, and of all their constituent parts, is therefore necessary for the composition of any architectural subject.

"Of these orders, the Doric, Ionic, and Corinthian are of Grecian origin. They exhibit three distinct and essential qualities in architecture—strength, grace, and richness.

"The Tuscan and Composite orders are of Roman origin. The former appears to have been invented for the purpose of exhibiting strength and rustic simplicity, while elegance and profusion appear to have been the object of the latter.

"By whom these orders were first invented, or at what time their improvement was advanced to the state in which they are to be found in the structures and fragments of antiquity cannot now be ascertained. We know nothing of their origin except what is related to us by Vitruvius, a writer whose correctness in many parts is much questioned. He is the only author upon architecture of the Augustan age, or for many ages afterward, whose works have come down to us. His writings are justly held in great estimation. It must be confessed, however, that his account of the origin of the orders has more the air of a fable than of an historical fact. Vitruvius informs us that 'Dorus, the son of Helen, and the nymph Opticus, who governed Achaia and the whole of the Peloponnesus, in some period of his reign, dedicated a temple to Juno in the ancient city of Argos. The order of architecture employed in this sacred edifice, which from its founder was termed Doric, was afterward adopted by the cities of Achaia, although no certain principles had yet been established by which its proportions might be regulated. In a subsequent era the Athenians, in conformity with the response of the Delphic oracle, by the general consent of the States of Greece, sent thirteen colonies into Asia, each conducted by an experienced leader, and invested Ion, son of Xuthus and Creusa, whom Apollo, by his priestess, acknowledged as his offspring, with the supreme command. He led them into Asia and possessed himself of the territories of the Carians. After the expulsion of the Carians and the Leleges, the new acquisition was called Ionia, from the name of the chief of the colonists, and temples were erected to the deities of the Grecian mythology, the order of architecture of which was similar to that observed in the sacred buildings of Achaia, and called the Doric, from having originated in the Dorian cities. The Temple of Apollo Panionius was the first they constructed in this manner. Desirous of adorning this temple with columns, but unpracticed in the rules of proportion, they were led to consider the proportions of the human frame, expecting principles to result from them by the adoption of which the great objects of strength and beauty would be obtained. Finding that the foot was a sixth of the height of the whole statue, they instituted the same proportions in their columns, whose height, including the capital, they made equal to six times the diameter of the shaft at the base. Thus the Doric column, formed according to the proportions of the human figure, and emblematical of manly strength and beauty, was first introduced in the temples of Ionia. In later times, however, when it was in contemplation to

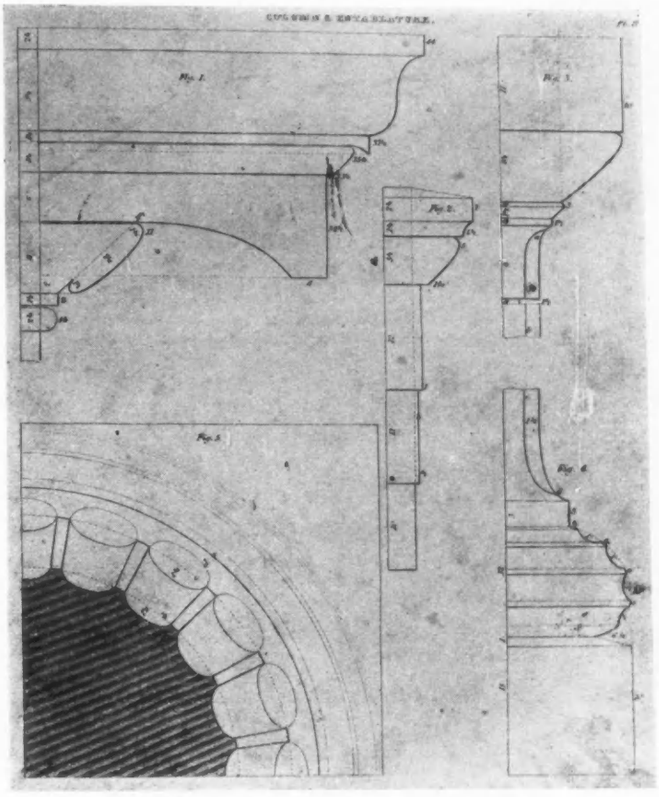
consecrate a temple to Diana, they sought to introduce a new order of columns by giving to them the proportions of the female form; and that they might be emblematical of feminine delicacy, the height of the columns was made eight times the lower diameter. Bases were also given to them in imitation of sandals, and volutes were sculptured in allusion to the ringlets which fell down on either side of the face. The cymatia and encarpi in front were intended to resemble the hair as it was then worn, and the shaft was channeled in such a manner as to bear some resemblance to the folds of the matronly garment.

"Thus the invention of two different orders arose; one exhibiting the boldness and simplicity of the masculine figure, and the other the more finished form of a woman, attired and richly decorated. Later ages, however, advancing in refinement and judgment, sought to give greater beauties to both by making the Doric column seven times its diameter at the base of the shaft, and the Ionic nine times its lower diameter. The order, whose use was adopted first by the Ionian colonies, was called the Ionic.

"The third order, which is named Corinthian, derives its symmetry from an intention to make the form of the column accord with the more delicate proportions of the maiden figure; for at that early period of life the limbs are less robust and the figure admits of a greater display of ornament. The invention of the capital is said to owe its origin to the following circumstance: A virgin of Corinth, just as she had attained to a marriageable age, was attacked by a disorder whose effects proved fatal. After her internment, the vases, the objects of her admiration when alive, were collected by her nurse and deposited in a basket, which she placed upon her grave, after covering it with a tile to protect it from the weather. The basket was accidentally placed over the roots of an acanthus. The natural growth of the plant being impeded by the pressure upon it, the middle leaf and the cauliculi appeared in the spring around the bottom of the basket. The cauliculi, attaching themselves to the external surface, grew upwards, until their progress was arrested by the angles of the tile projecting over the basket, which caused them to incline forward and assume a spiral form. At this stage of its growth, Callimachus, who, from his great genius and talent for sculpture, was called Catatechnos by the Athenians, chancing to pass by the spot, observed the basket and the beauty of the young foliage around it. Pleased with its novel and fanciful appearance, he adopted it in the columns which he afterwards employed in the edifices of Corinth, having first instituted laws for the proportions of the order, which was thence termed Corinthian.' * * *

"In both Greece and Rome many ancient examples have been discovered which have been accurately measured and transmitted to us. We have therefore an opportunity of critically examining all the various examples, and of deliberately deciding what parts it will be wise to imitate and what to reject.

"It is, however, to be remembered that all the ancient Grecian examples within our knowledge were employed to adorn edifices erected for public purposes, which were mostly of an enormous size and of such a construction as to require columns very large and thickly set. It will, therefore, be highly proper in us to take into consideration the uses to which these elegant temples were applied. their size, their construction and their decorations, and



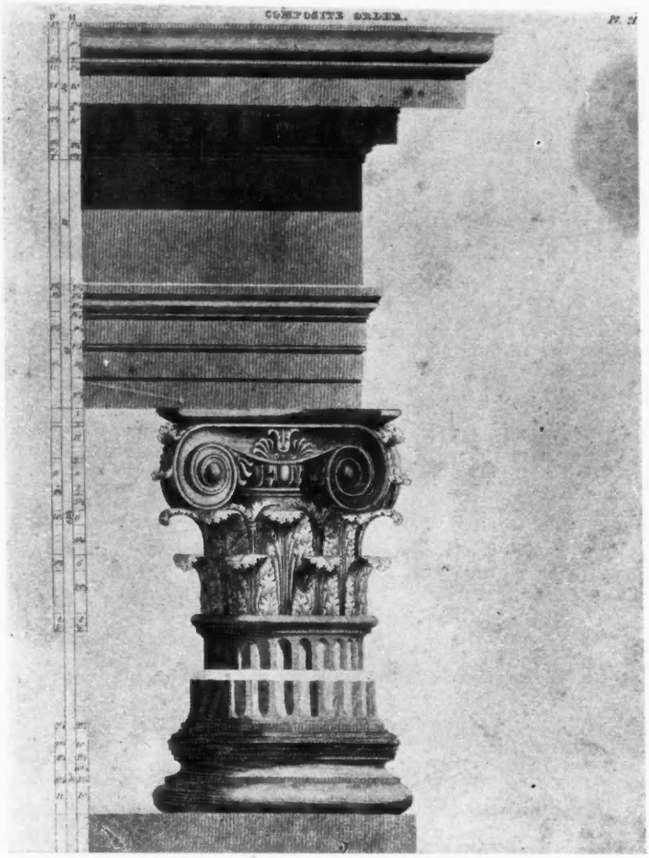
"DETAILS OF A COLUMN AND ENTABLATURE"

compare them with our times, our customs and our wants, and then to imitate in the whole or in part any of these examples, with such alterations and adaptations as will render them conformable to our purposes."

He defends the Tuscan order, while admitting the superiority of columns to entablature: "Some architects are unwilling to allow this column and entablature the honor of being ranked as one of the orders of architecture. They say, 'It is nothing more than the Doric deprived of the mutules and triglyphs, and a diameter or two added to the height of the column.' I cannot perceive the justness of these remarks. If any one of the orders is to be altered into the Tuscan, the Ionic would certainly be more suitable for that purpose than the Doric. Change its capital and base for those of the Tuscan, leave off the flutings on the shaft of the column and deprive it of a diameter or two in height, and the change is complete.

"In the examples of this order, as here exhibited, the column is seven diameters in height, including the capital. This seems to have been the universal standard of its height, from the time of Vitruvius down to the present. Nevertheless, during a long course of practice, it is probable that in half of the instances where I have had occasion to draw either of the orders I have found the established proportions ill suited to my purpose. Many circumstances render different proportions both proper and necessary. The proportions, in fact, depend upon the judgment. He who takes the most comprehensive view of all the circumstances of the case and governs his judgment by the simple and undeviating rule of proportioning the means to the end, will generally be the most successful.

"Take the case of a Venetian entrance recessed into a dwelling-house, embellished by two columns, and two



"EXAMPLE OF THE COMPOSITE ORDER"

antae, their front line corresponding to that of the front of the building. The whole front above and directly over the entablature apparently depends on the two columns for support. Under such circumstances, anyone who should fail to make a column nearly or quite a diameter less in height than he would if the columns projected and were completely insulated from the front line of the building and had nothing but their entablatures to support, would soon be convinced of the error in his judgment. When columns are to be erected, consider for what end they are to be made: if for the support of any great weight, then make them of a size sufficient to answer that end; if for ornament only, and not for the support of any great burden, construct them accordingly."

Here is a typical excerpt from his discussion of the Doric order:

"Sir William Chambers and some other modern architects have proportioned the entablature by the height of the column, and not by its thickness, making it one-fourth part of that height. This practise should not be imitated. A Doric column, one foot in diameter, would be eight feet in height. The above rule would give one-fourth of this height, or two feet, to the height of the entablature. But a Corinthian column, one foot in diameter, would be ten feet in height; and therefore the same rule would make the height of the entablature two feet six inches. Now it will be readily admitted that the Doric column, of one foot in diameter and eight feet in height, is capable of sustaining a greater weight than the Corinthian column of the same diameter and ten feet in height. This rule is therefore defective; because the Corinthian column would not be capable of sustaining so heavy a weight as the Doric, at the same time that it would be loaded with an entablature one-fifth higher than that of the Doric. On the authority of Vitruvius, we suppose that the proportions of the Doric order were taken from those of a robust man, and of the Corinthian from those of a young female; and it appears inconsistent to load the latter, therefore, with a greater burden than the former."

After describing the Roman style of entasis, he states his preference:

"This method of diminishing columns is introduced here because custom seems to require it, and not as a recommendation for its use. I do not know of any situation where the Grecian system is not decidedly preferable. It is said that the shafts of columns were at first made of trunks of trees, and afterwards in imitation of them. But although the trunk of a tree diminishes upwards, yet the lines of its sides are straight, or nearly so; so that the Grecian architects showed their wisdom in closely adhering to this natural and graceful form. It is well known that a column whose sides are in straight line will appear as though its sides were gently curved inwards, for which cause the Grecian architects undoubtedly made the sides of their columns to swell gently outwards, with the intention that they should appear to be straight to the eye. This practise should be imitated."

The model which he illustrates for the Ionic order is frankly a composite. As he explains:

"The example here exhibited is decidedly Grecian, the base being the only member which can claim any affinity to the Roman practise. The different members of this composition have been carefully selected from the most approved specimens of this order, with such deviations therefrom as were supposed necessary to adapt them completely to the American practice. Nor were they hastily brought into the form which they now assume, for my practice as an architect has favored me with frequent opportunities of having this example wrought by the most skillful workmen, and of removing original defects after a diligent examination of each member separately and collectively."

A similar composite is shown as a Corinthian model. Mr. Benjamin has some ingenious comments on the Composite order:

"It has before been stated that this order is not now in public favor; nor does it appear to have been held in much estimation since the days of the Roman emperors. It nevertheless has had a place assigned to it in all, or nearly all, the practical books on architecture for the last century. This order was employed by the Romans in all their triumphal arches and in other similar structures. It was ornamented in the most profuse manner, every member, where propriety did not forbid it, being covered by the most costly and beautiful ornaments. It is, therefore, reasonable to suppose that it could not have been viewed with that impartiality with which it would have been if dressed in plain attire, in which case the eye would at a glance comprehend the whole outline of the order and immediately decide on its merits, instead of being, as it in fact was, so fascinated in viewing the great profusion of the most costly and elegant enrichments as to overlook the general outline of the composition. Believing these views to be correct, and that this order ought either to be left out or in some way to be revised and modernized, I have been induced to examine in the most critical manner all the examples in my possession, and the result has been

a determination to try my skill on its reform. How well it has succeeded it is not my part to decide. Had it been one of the established orders, I should have shrunk from the task, but as this composition is denied the name and rank of an order by many of our most eminent modern architects it is thought to be a fit subject to work upon. The shaft of the column does not require any alterations from that found in the ancient examples of this order, it being there a close imitation of the Corinthian shaft as described in the explanation of that order.

"The base of the column has been left off because it was generally the same in character and effect as that which adorned the Corinthian column. The one here substituted is in the Grecian style, inasmuch as the upper torus is fluted, in imitation of many of the best examples of Grecian bases, and the lower torus terminates, and is supposed to stand, on a step without an intervening plinth.

"The lower Corinthian part of the capital is in exact imitation of that found on the arch of Septimus Severus at Rome, but in the upper, or Ionic part, there are many deviations, such as the dropping of the echinus and bead lower down, the effect of which is to reduce the plain, naked and awkward space left between those mouldings and the termination of the long leaves and to make a union between the upper and lower parts of the capital, so as to give it the appearance of one piece of composition. Before this deviation took place there was a complete separation between the upper and lower parts of the capital.

"Again, in each face of the upper part of the capital the stiff awkward form of the Roman Ionic capital has given place to the graceful Grecian. The latter change cannot fail to be approved by all those who are judges of this art.

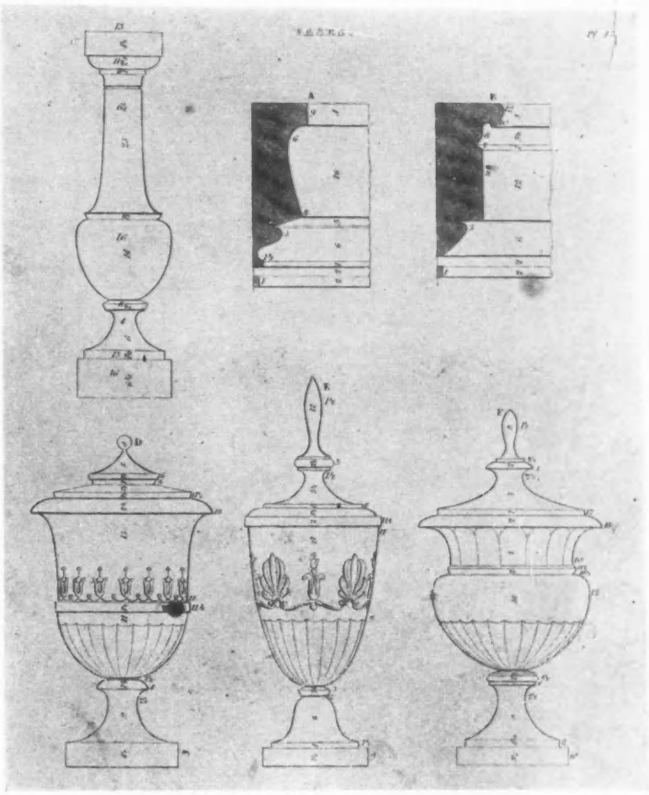
"In the cornice, the modillion, which generally made one pretty large member of the bed-mould, has been left off and a dentil substituted in its place. In this procedure the cornice of the example from which the leaves of the capital were taken has been imitated, but in no other respect can I claim protection for that or any other example of that order.

"I have endeavored to give to this composition a more systematic arrangement than that which it has heretofore possessed. It has already been stated, in describing the origin of this order, that it was borrowed from the Corinthian and Ionic; that, from the upper extremity of the long leaves down to the termination of the base, it was Corinthian; that the upper part of the capital was Ionic, and the entablature a mixture of both orders.

"The only difference in expense between this composition and the Ionic is, then, that of the leaves, which form the lower part of the capital. As now modernized and reformed, it will probably in many situations be found worthy of imitation."

His own offering, an additional column, he modestly suggests as a humble substitute to meet various requirements.

"I am aware that the publication of anything in the shape of an order, unless it be really one of the Grecian or Roman orders, is, by persons well versed in architecture, thought to be little less than heresy. Although I am not much disposed to differ with them in their opinion, I have deemed it advisable in this case to depart from it. My reasons for so doing proceed from the fact that more than one-half of all the columns and entablatures erected in country situations, for either internal or external finishings, belong neither to the Grecian nor Roman system. The same fact holds true in relation to our cities and large towns. Any person who will take the trouble to compute the number of instances in which some one of the regular orders is employed in any street of our cities or villages will be convinced of the truth of this assertion. I have made the comparison in two streets, which present more buildings of the first class, in proportion to their number, than any other streets of their length in this city, and have found the regular orders employed in only thirteen places, while other columns and entablatures were substantiated in twenty-three places.

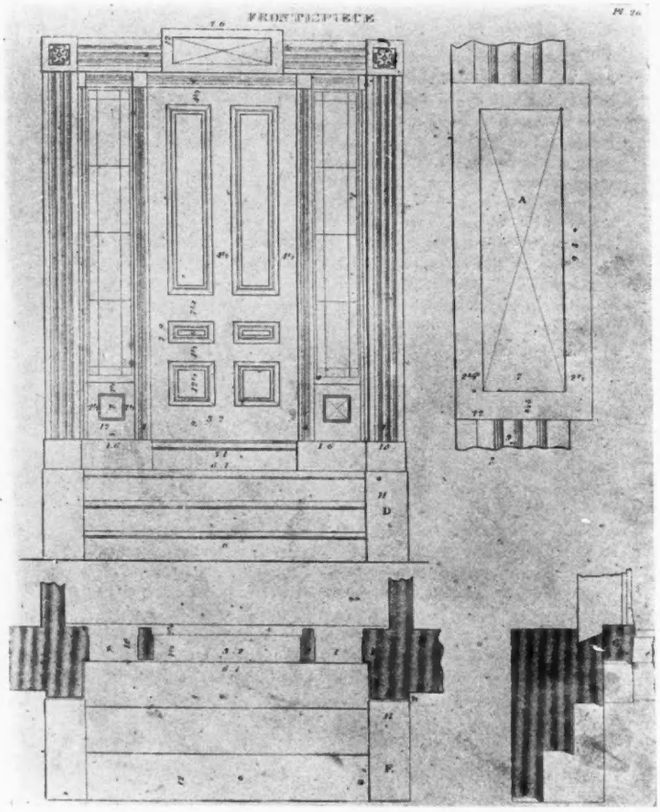


"EXAMPLES OF VASES, SUR-BASE MOULDINGS, ETC."

"I have often inquired the reasons of this, from very intelligent workmen, and have as often received for answer that the Tuscan order is too massive and plain, the Doric too expensive and the Ionic too rich, and that they are therefore under the necessity of composing a column and entablature which will conform to the views and purses of their employers.

"With these facts before me, no doubts rest in my mind but what it would be better to give a design here of a column and entablature constructed on scientific principles, and of a character capable of meeting the views and practice above mentioned, than to leave it to be composed by unskillful hands.

"In the composition here exhibited the shaft of the column, together with its flutes and fillets, are in imitation of that found in the interior of the Temple of Apollo at Bassae. This column was crowned with a very singular Ionic capital, of an angular form. Its base was also singular in its composition. Neither of them, however, were deficient in beauty. The shaft has here been adopted on account of its novel, graceful and simple aspect. The



"EXAMPLE OF A FRONTISPIECE, WITH SIDE LIGHTS"

flutes in their section are in exact imitation of the best Grecian Doric flutes, but differ from any of the Doric examples by being separated by very small fillets, which are in breadth equal to one-fifth or sixth of the breadth of the flute. The flutes are twenty in number and descend and terminate on the scape of the column in an elliptical form, like their section. They also terminate at their upper extremity on the scape in the same manner. All the details of the flutes and fillets, and also those of the whole composition, are very accurately drawn on a large scale and figured in minutes. Great care has been taken to give to the outline of all the mouldings the true Grecian character.

"The base is in its general form somewhat like that given by Vitruvius in his Tuscan order, but the torus is elliptical and fluted, in imitation of some of the best Grecian examples of the Ionic base. The base is not, therefore, either Tuscan or Ionic, but it stands in equipoise between the two.

"The capital is imitated from that found on the newly discovered temple at Cadachio, in the island of Corfu. In its annulets it partakes of both the Grecian and Roman schools, but in the remaining details it is purely Grecian, and a beautiful specimen of their system.

"The entablature is two diameters in height and is divided into three parts—the architrave, the frieze. and the cornice—the details of which have been selected with a view to economy and an adaptation to the column and to modern practice. In the cornice the corona has a great projection and height; the crown moulding has also a great height but a small projection. The bed-mould is somewhat singular in its form, and about one-half its altitude is recessed up into the plancer of the corona, which allows the members of the cornice to be somewhat enlarged. With one single exception, each moulding of this composition is indebted to some one of the conic sections for its beautiful variety of outline. As the selection and arrangement of the elements which compose this column and entablature have been the cause of much research and great solicitude, I hope that when it shall be decided not to employ either of the regular orders this composition may be found worthy of being made a substitute."

What he terms "Frontispieces" deserve mention, not so much for their own merit as for his general remarks:

"In some specimens of this important portion of architecture one frequently discovers a strange fancy exhibited in the unmeaning cuttings, carvings and twistings of the details and their frequent breaks over columns, pilasters, tablets, etc., which renders their appearance quite ridiculous to a well-tutored eye. We frequently see a failure, likewise, in the general proportion of their outlines, such as a disproportionate quantity of glass over and at the sides of the door. It should be remembered that the door is the principal and the windows are subordinate. The side and fan lights should not, therefore, occupy a larger space than is necessary to admit a sufficient quantity of light into the entry; and where a door is accompanied by side lights, and a fan light extending over both door and side lights, the outline of its upper extremity should be a segment of a circle and not a straight line. In the latter case the distance from the upper extremity of the division which separates the door from the fan lights to its top edge will be so great as to produce the appearance of instability, which appearance, by the use of a curved line bounded by an arch, is wholly avoided. But where the fan light extends over the door only, a straight line, for its upper extremity, is preferable to any other.

"In adjusting columns, pilasters, architraves, etc., to this species of architecture, nothing will direct the judgment of the student so unerringly as the often-repeated maxim of proportioning the means to the end. Let him, therefore. bear in mind the extent, situation and character of the building of which his frontispiece or portico is to make a part, together with the size and decorations of all their elements, as well as the burden which the columns or pilasters to be employed have really or apparently to sustain. and. if he possesses a good knowledge of the art. the result of his labors will probably be successful. * * *

"The example of a frontispiece exhibited here is suitably constructed for the front of a house of pretty large dimensions. The door is divided in the center by a vertical line, one-half of which will be sufficiently large for the ingress and egress of one person. The advantage gained by this practice is very important in boisterous situations, as it will admit but one-half as much cold air when opened as it would were the whole door opened at once. * * *

"The example of an Ionic portico exhibited on this plate is in its general proportions, and the outline of its details, in imitation of the example of that order as represented on Plate XIV.

"A similarity may be remarked in the size and construction of the doors and side lights of this and of all the preceding examples. This sameness I do not strive to avoid, from the belief that a great variety in the size and construction of these essential but subordinate portions of architecture is not required by a correct taste nor adapted to the place they occupy.

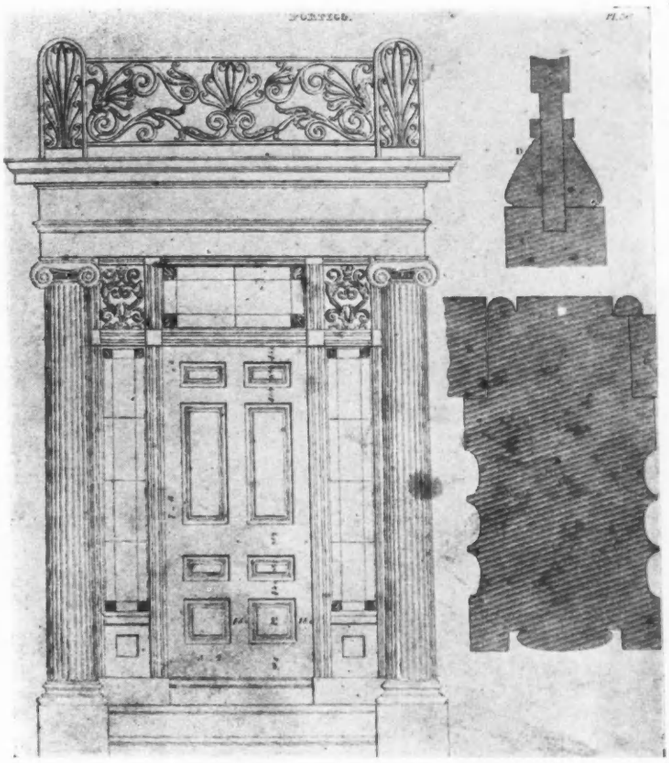
"If decorations are desired on these windows, let them

be made with a sparing hand, on stained glass, and of a proper size and figure, for the student must remember that it is a maxim in architecture that the ornament must be made for the place and not the place for the ornament. A practice has heretofore prevailed among designers and makers of side and fan lights, and is not yet quite extinct, of exerting their ingenuity in the contrivance of a great variety of crooked, winding outlines, which they applied to the formation of the internal divisions of these sashes, and their imagination was again taxed in contriving a great profusion of rosettes, stars, beads, etc. After the elements had thus been adjusted upon the sash bars, their surface was often adorned with gold leaf. These gorgeous windows are often seen in dwelling-houses of exceedingly plain exterior and present a contrast quite ridiculous to a well-tutored eye."

Hear what he has to say about ornament: "Ornaments are more or less valuable as they harmonize with surrounding objects. It is wise and prudent to use them with a sparing hand, for their absence from the composition does not necessarily imply defect, though it might imply an appearance too plain and naked to a good judge. But a work unnecessarily loaded with ornaments will be disfigured, not embellished, by them. In the execution of ornaments the subject intended to be imitated, whether it be the chestnut, the egg or the acorn, they being the usual enrichments of the ovolo, should be so deeply cut into the moulding as to produce the appearance of their being almost detached from it. The same observations will equally apply to the berries or beads, which are the standing ornament of the astragal.

"When ornaments are liable to close inspection, every part should be well expressed and neatly finished; but when their situation is such that they can be seen only at a distance, the nice finish may be omitted, but their details must be strongly expressed. In sculpture a few rough, bold strokes from a skillful hand expresses the subject intended for imitation more effectually than the most elaborate unskillful efforts would be able to do."

His remarks about stairs are especially interesting from a historical standpoint: "Every building consisting of more than one story is indebteded to this portion of architecture for ornaments as well as utility. The height, breadth and length of the steps should be proportioned to the situation and use for which they are constructed. This remark, however, is subject to this qualification—that the height should never exceed eight inches nor the breadth twelve. Every workman is supposed to have a sufficient knowledge of all kinds of stairs, except those on a circular plan. The method most practised, of forming the circular part of the rail without a cylinder, is comparatively of recent date. To the ingenious Peter Nicholson of London we are all indebted for this method. It was invented by him and published in the year 1792, and since that time it has wonderfully extended itself into practise. In the year 1795 I made the drawings and superintended the erection of a circular stair-case in the State House at Hartford, Connecticut, which, I believe, was the first circular rail that was ever made in New England. This rail was glued up around a cylinder in pieces of about one-eighth of an inch thick. Since the first discovery of the true principles of hand-railing, Mr. Nicholson has made several important improvements, for one of which, about twelve or thirteen years since, the Society of Arts in London awarded him a gold medal. This improvement ren-



"EXAMPLE OF AN IONIC PORTICO"

ders the subject of the most simple and direct of any of his methods. I have, therefore, adopted it as my model here, with some trifling deviations."

He refers feelingly to some difficulties which are still encountered in building churches: "The liberality displayed by the members of this community, in the ample appropriations which they so frequently make for erecting houses of public worship, is highly creditable to them.

"The magnitude and beauty of many of these buildings render them honorable monuments of public munificence, and if many of them likewise exhibit a barrenness of invention and ignorance of architecture, this defect is to be ascribed, not to any fault on the part of those who provide the funds, so much as to the disadvantages under which those labor who are selected to construct the building. We cannot expect a carpenter to shape an edifice in so classic and correct a style as one who confines his labors to the study of architecture. Let an architect of competent skill be employed to prepare the draught of the building, together with the working drawings for the workmen; and especially, when a plan has once been determined and begun upon, let it not be in any important respects departed from, and buildings of the latter class will soon disappear. Alterations are generally expensive and are apt to destroy the symmetry of the building.

"A house erected for the worship of the Supreme Being should correspond in character with the reverential feelings of those who assemble within it. While, therefore, we aim at elegance in the form of the columns, pilasters, entablatures, ceilings, windows, and doors, let it be a grave and simple elegance and not of the gaudy kind. The details should be free from any unmeaning cuttings or twistings. Light, gay colors and all symbols of heathern worship should be avoided.

"The interior of a church would have a more chaste and

(Continued on page 30)

The GARDEN

BORDER OF DELPHINIUM, DIGITALIS AND SWEET WILLIAM

BEDS OF HERBACEOUS PERENNIALS

THE LANDSCAPE VALUE OF PERENNIALS

BY PROFESSOR JOHN W. GREGG

LANDSCAPE ARCHITECT—UNIVERSITY OF CALIFORNIA

IN this country it is probable that herbaceous plants have not yet attained the same degree of popularity as in Europe, where they rank high in public favor among all the cultivated plants for ornamental purposes. Their popularity is not surprising when one considers the many and varied changes which take place during the growing seasons, and the wonderful improvement which has been made in varieties.

With such a wide range of climatic and soil conditions here in California and an ever increasing demand for more flowers in our gardens, it is surprising indeed to note the general neglect of this most valuable and decorative class of plants, commonly referred to when spoken of at all as "herbaceous perennials." A well-planned and well-planted garden or border of perennials begins the season in earliest spring and does not complete its cycle of bloom until that same season returns again. Almost every day throughout this long period of bloom the perennial border or flower garden is changing with the seasons, something new coming into bloom continually, so that one effect is soon replaced by another before it has time to become monotonous. Such a garden is never tiresome; it's past is a pleasant memory, it's future a delightful anticipation.

Perennials usually produce the best effect when arranged as a "border planting" in front of a good background of shrubs or a hedge. A wall or fence over which suitable vines can be grown may also furnish attractive backgrounds for the wealth of bloom and foliage produced by the herbaceous material. Such a "border" can be as long as taste and room in the garden will permit, and can range in width from five to nine and even twelve feet, according to the length and general design of the garden as a whole. The "border" may face a gravel walk, or a lawn may define its outer edge either in the form of a straight line or in gentle flowing curves. A most charming vista is often produced when a straight grass or gravel walk is bordered on both sides with broad plantings of perennials and biennials, all terminating in some garden feature such as a summer house, sun dial or garden seat.

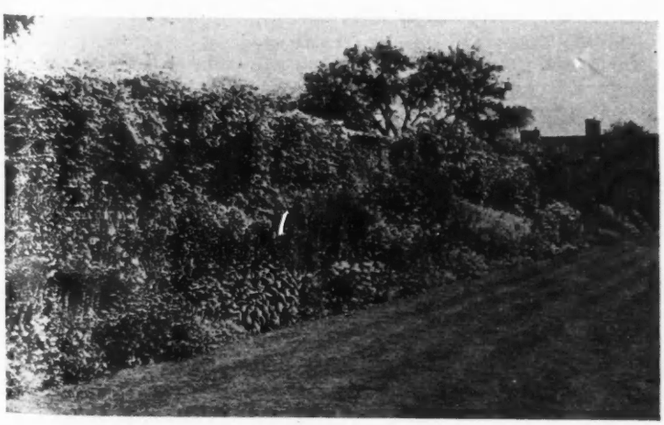
In growing hardy flowering plants we should not forget the ways of nature, choosing such varieties as are most suitable for the soil and position at hand. As a rule, how-

ever, most of them do well in any good, well-drained garden loam which has been deeply worked and enriched with a liberal application of stable manure.

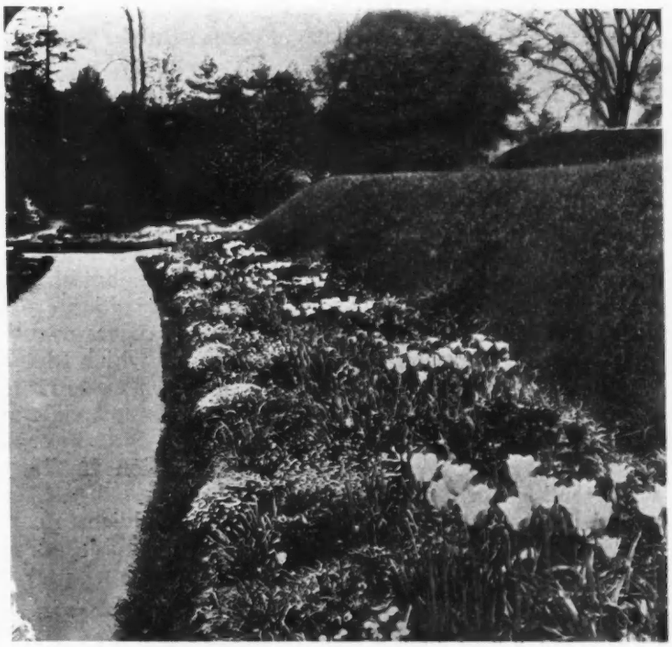
Some plants, like "peonies," demand deeply worked trenches before they will produce their best growth, while all plants of this class demand good drainage, semi-aquatics being the only exception.

If one would produce the very best results with herbaceous perennials, it is absolutely necessary to prepare a planting plan of the border beforehand, showing just where each variety is to be planted. Harmony of color is of utmost importance, while a succession of bloom is necessary if the "life" of the border is to be continuous. These two important factors must be studied carefully and plans definitely prepared before planting begins. Tall growing varieties should as a rule find positions at the back of the border, but the mistake is not infrequently made of carefully graduating the heights so that the tallest are always at the back and the lowest at the front, just as one would arrange potted plants on a greenhouse bench. In this way plants often lose a certain amount of individuality which it is necessary to maintain if the charm of the border is to be realized. A most effective arrangement is obtained by allowing some tall or medium growing varieties to come clear down to the front border, thereby producing a greater apparent depth. Such an arrangement should not be too frequent, however, because the length of the border would apparently be shortened, and the value of the long vista destroyed. Early flowering varieties should not be too near the edge of the border unless they retain good foliage until late in the fall, and others should be in front of them so that no bare places are ever apparent. Plants should be arranged in clumps or groupings in large or small numbers, according to the prevailing color note wanted at any one season.

The principal problem to solve in grouping is the arrangement of colors and one must have a good knowledge of the plants used in order to produce the best effects. Of course certain fundamental rules of color harmony must be observed and yet one's personal taste may play a very important part in arranging color combinations. One of the hardest colors to handle is violet and it must, with some others, be placed by itself and never put near red or pink. By means of white and pale yellow one can change from blue to other colors until clear pink, dark red and deep yellow are obtained in their proper place in the border.



PERENNIALS BANKING IVY AND ROSE-COVERED WALL



HARDY BORDER OF THE EARLY SPRING

The maintenance of a hardy border is finally the determining factor if the very best continuous effect is to be produced. Careful watering, thorough and frequent cultivation and annual mulching with good manure are all essential operations, while the picking of seed pods and cutting of old flowering stocks help materially in maintaining a good appearance after plants are through flowering. Many varieties have a tendency to spread rapidly and they must not be allowed to crowd out other desirable plants to the detriment of the whole border.

The plants listed below are not the only ones of this class that are beautiful or desirable. There are many more, but those here listed will always prove satisfactory:

Alumroot—Heuchera
Astilbe
Baby's Breath—Gypsophylla
Bellflowers—Campanula
Blazing Star—Liatris
Bleeding Heart—Dicentra
Candy Tuft—Iberis
Campion—Lychnis
Christmas Rose—Helleborus Niger
Chrysanthemum, in variety
Columbine—Aquilegia
Coneflower—Rudbeckia
Coreopsis
Cornflower Aster—Stokesia
Daisy—Bellis
Foxglove—Digitalis
Fuschia
Gaillardia
Hardy Pink—Dianthus
Hollyhock—Althea
Iceland Poppy—Papaver
Iris
Larkspur—Delphinium
Marguerite
Meadow Rue—Thalictram
Michaelmas Daisies—Aster
Monkshood—Aconitum
Oriental Poppies
Peonies—Paeonia
Phlox
Platycodon
Primrose—Primula
Pyrethrum
Rock Cress—Arabis
Sea Pinks—Armeria
Snakeroot—Cimicifuga
Speedwell
Sunflower—Helianthus
Sweet William—Dianthus Barbatus
Windflower—Anemone
Yarrow—Achillia
Yellow Day Lily—Hemerocallis

ARCHITECTURE IN THE UNITED STATES ONE HUNDRED YEARS AGO—(Continued from page 27)

correct appearance, if without galleries. But to the omission of galleries there are objections. Where the society is large they cannot all be seated upon the floor of the building near enough to the speaker to hear his voice distinctly; and the increased expense of erecting a building of sufficient size without galleries is considerable. It is but seldom, therefore, that we see a church of any magnitude free from this encumbrance. It is a practise with some to make only one tier of windows. This is a very becoming practise so far as the exterior of the building is concerned, but in the interior, where these windows cross the galleries, they present a very awkward appearance.

"The plans, elevations and other drawings which I have given in this example of a church have been made more for the purpose of conveying a clear and distinct view of the relation which the several parts should bear to each other and to the whole than with an expectation that they will often be executed in this manner."

And finally he gives some very sensible advice to carpenters, which is as valuable now as it was one hundred years ago:

"The principles of this science should be familiar to every practi-carpenter. Carpenters who do not possess a thorough theoretical knowledge of their art are apt either to load their work with timbers unnecessarily large and expensive or on the other hand to provide timbers too small and weak to resist, for a sufficient length of time, the strain imposed upon them. A knowledge of the stiffness of timber and other materials employed in carpentry, theoretically as well as practically, will be of the highest utility. This information is furnished by the result of various experiments, made for the purpose of ascertaining the different strains which different sizes of those materials can bear, by several scientific gentlemen of Europe. Of course these experiments were made on European timber. We, therefore, must make proper allowances for the difference of timber. Different individuals have arrived at different results in their experiments. We cannot, therefore, put implicit confidence in any of them; but, taking them collectively, and making proper allowances for difference in timber, we may asssist our judgment and obtain correct views on the subject."

THE HIGHLAND HOSPITAL OF ALAMEDA COUNTY, CALIFORNIA

THE Board of Supervisors of Alameda County at a recent meeting authorized the initial contract for building construction on the Highland Hospital of Alameda County, the first unit of which will require an ultimate expenditure of one million dollars to complete, while remaining units to complete the entire group of buildings will entail a total cost of about two and one-half million dollars.

The site selected for the new hospital was purchased about two years ago and is located in East Oakland at Fourteenth and Vallecito Place. These two streets intersect at an acute angle resulting in a triangular piece of land containing about ten acres, to which the hospital plan will fit.

The lot has been graded to provide sites for the buildings and is arranged on two levels varying about fifteen feet, and the buildings designed to fit to these varying levels. The entire site is elevated above the streets and will be terraced from retaining walls and with roadways and approachs of easy grades.

The ultimate capacity of the hospital will be about five hundred beds, but the first unit will be limited to one hundred and fifty beds.

The shape of the property has permitted a plan that lends itself to economical and convenient operation on the axis line of the group, bisecting the angle of the two street fronts, and balanced symmetrically thereon will be located the Administration unit, the Surgical unit and the Service Building, while connecting corridors will travel therefrom and be extended parallel to the two streets. The Ward Buildings will radiate from these corridors, four on the Fourteenth Avenue side and three on the Vallecito Place side.

The Service Building will lie directly between the ward groupings and behind the Administration and Surgical units. It can here be seen that the groups of ward buildings are drawn in toward the Service Building, concentrating and economizing the service.

It will likewise be seen that there are no cross currents of communication as between the Service from the Administration and Surgical units and that from the Service Building.

The Service Building will have the receiving department for foodstuffs and supplies on the second floor, reached directly from a receiving platform facing the rear service yard. The main kitchen and serving room will be placed on the third floor, while the first floor of this building will be devoted to the storage of supplies, etc.

Two freight elevators will be provided for the rapid handling of materials in this department, one of which will be for the exclusive use of the kitchen, while the other will be used by the storekeeper.

In addition to the main kitchen, the third floor will contain three cafeteria dining rooms for nurses, staff and male and female employees, also a bakery, main diet kitchen, dietician's office and school, etc.

On the second floor, connected with the receiving department, will be the various refrigerator boxes for storage, as well as other subdivisions for the storekeeper department.

Food distribution to the various wards will be by means of food wagons carrying container of foods fitting to steam tables in the respective diet kitchen of the wards. This distribution will be on the third floor to the respective ward buildings, thence by elevator in the ward buildings to the proper floor.

Distribution of supplies to the wards from the service building will be by elevator to the basement corridor, thence to the respective ward buildings.

Each ward building will have its elevator extended to the fourth story, where a space will be provided for roof gardens, partly open and partly closed in.

The typical ward plan departs somewhat from the old custom of large open wards. The capacity of each ward floor will be twenty-five beds, but distributed in small units ranging from one to six beds each.

A central corridor will extend from the main connecting corridor the full length of the ward building and terminate at the solarium The nurses' station will be located about half way on this corridor, giving supervision in either direction.

Likewise in a central position will be located the diet kitchen and dining room for convalescent patients. The usual treatment rooms, utility rooms, apparatus room, internes room, toilets, baths, etc., are provided as shown in the plans.

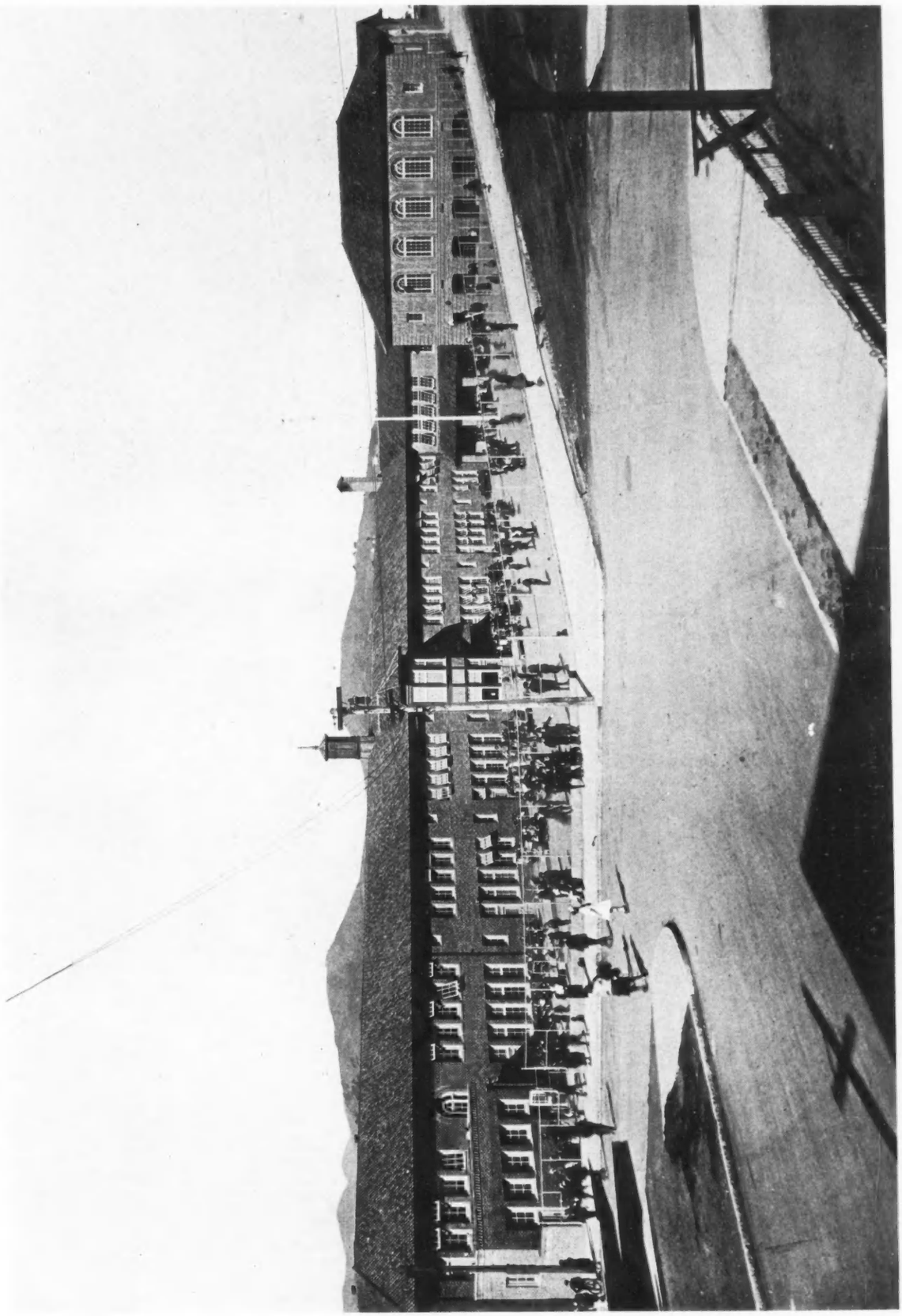
All buildings are to be constructed of reinforced concrete throughout. The exterior treatment will be of cement stucco on all plain surfaces, with all decorative features and all cornices of polychrome terra cotta. Roof, where treated architecturally, will be of Spanish tile.

On the interior of the buildings all partitions will be of metal studs, plastered, and all exterior walls of ward buildings will be furred in similar materials. Floors of treatment rooms, diet kitchen, toilets, etc., will be of battleship linoleum, cemented on the concrete floors. Tile wainscots will be provided in all space subject to hard usage and where plastering would be damaged.

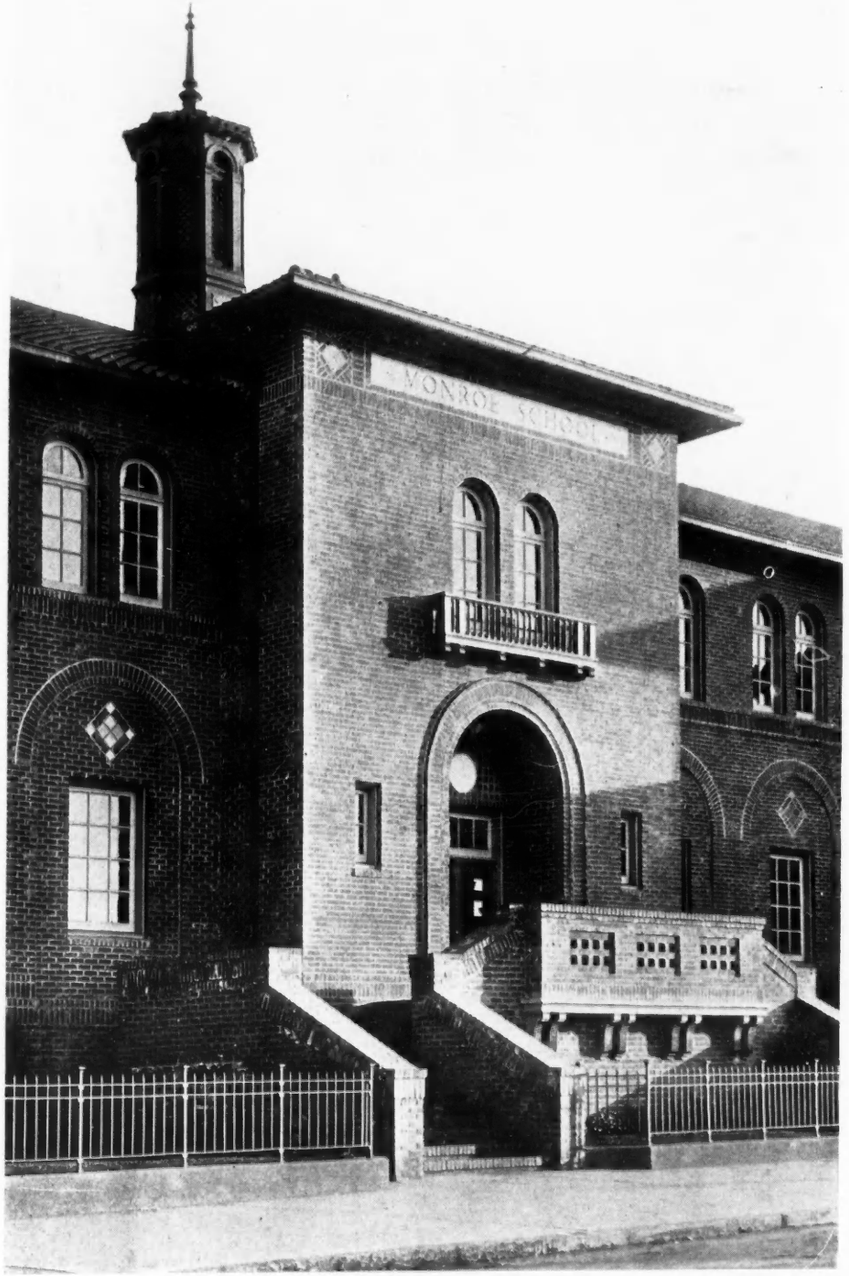
The usual doctors' and nurses' call systems are to be provided, embodying all the latest features. Emergency circuits in the lighting systems will avoid breakdowns.

The power house unit for the institution will be located at the northeast corner of the property and will be connected to the main group by an underground tunnel level with the basement floor.

Combined with the power house will be included the refrigerating machine, laundry, incinerator and the various mechanical shops.



PLAY YARD ELEVATION
MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA
JOHN REID, Jr., Architect

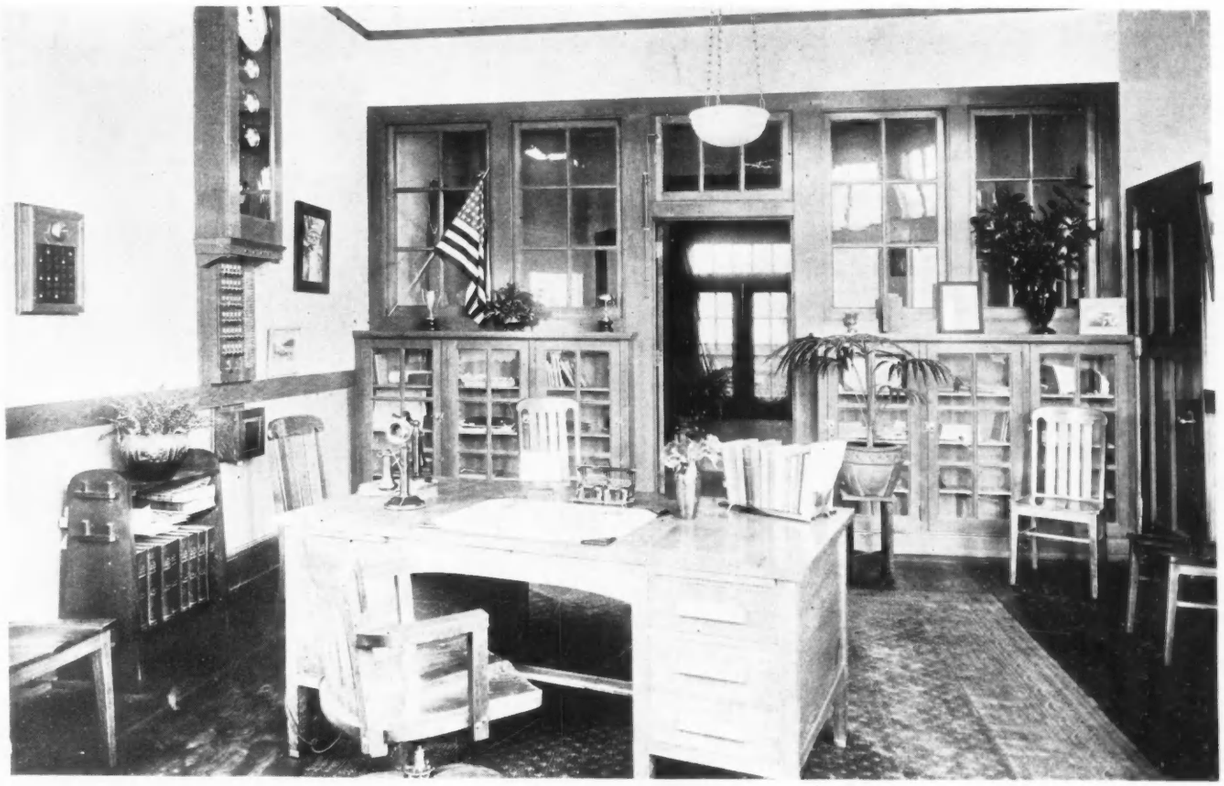


MAIN ENTRANCE

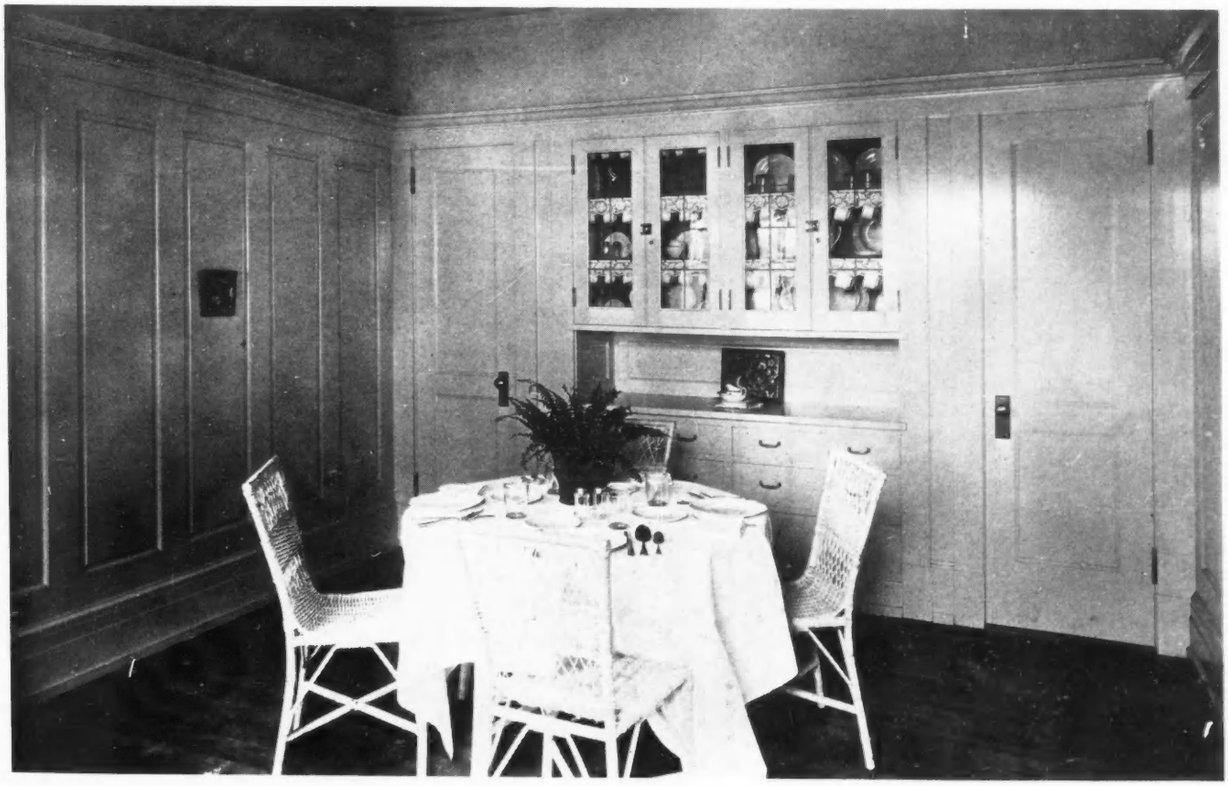
EXTERIOR DETAIL OF PRINCIPAL'S OFFICE AND LIBRARY

MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA

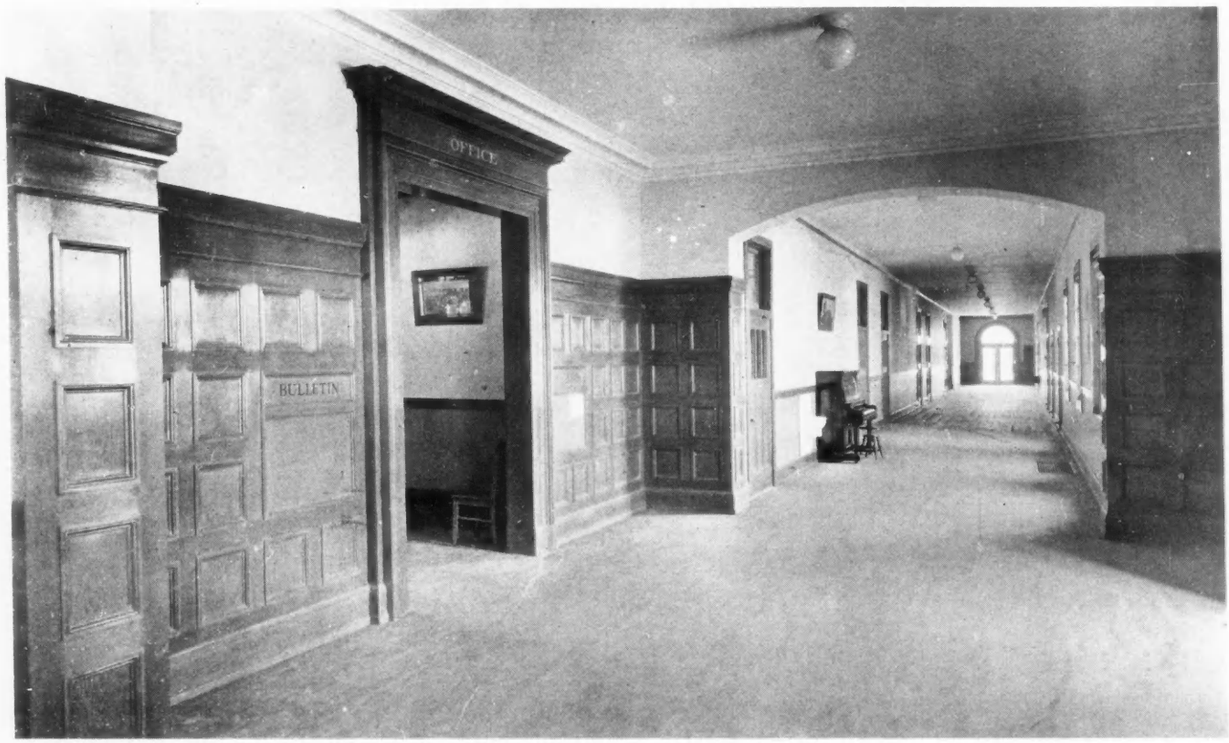
JOHN [illegible], Jr., Architect



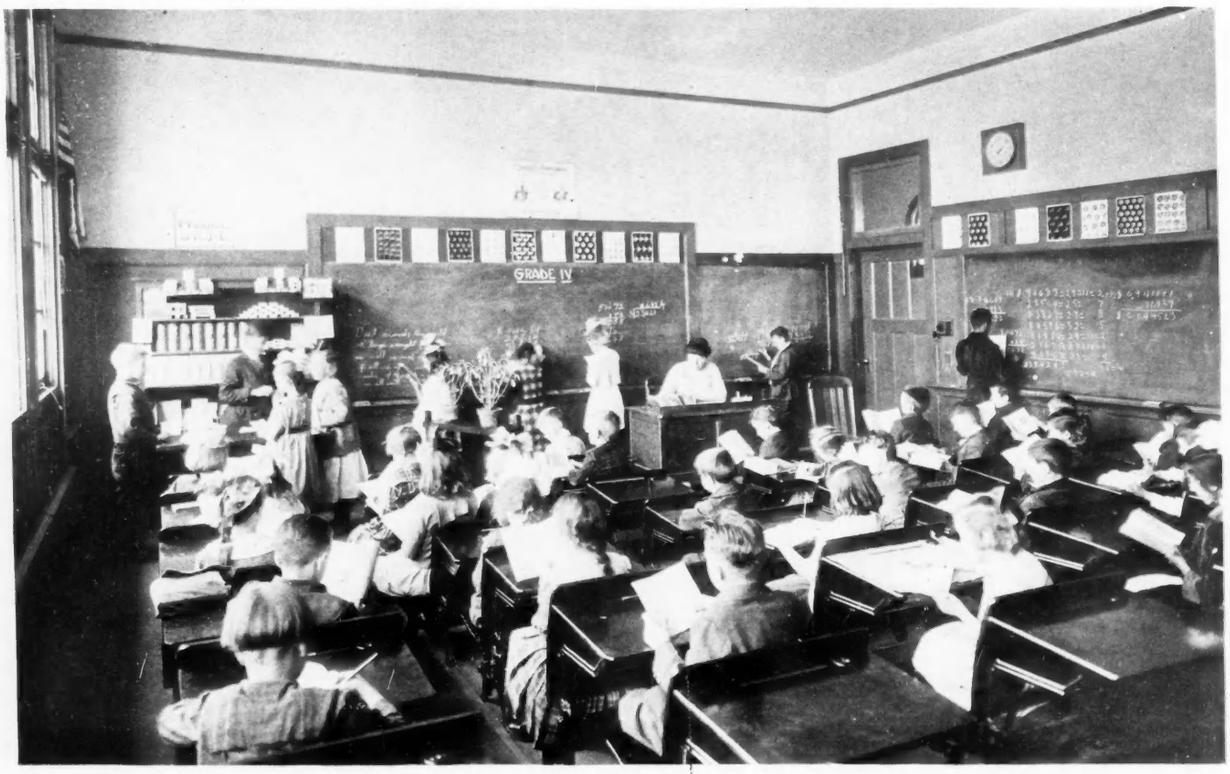
PRINCIPAL'S OFFICE



MODEL DINING ROOM
MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA
JOHN REID, Jr., Architect

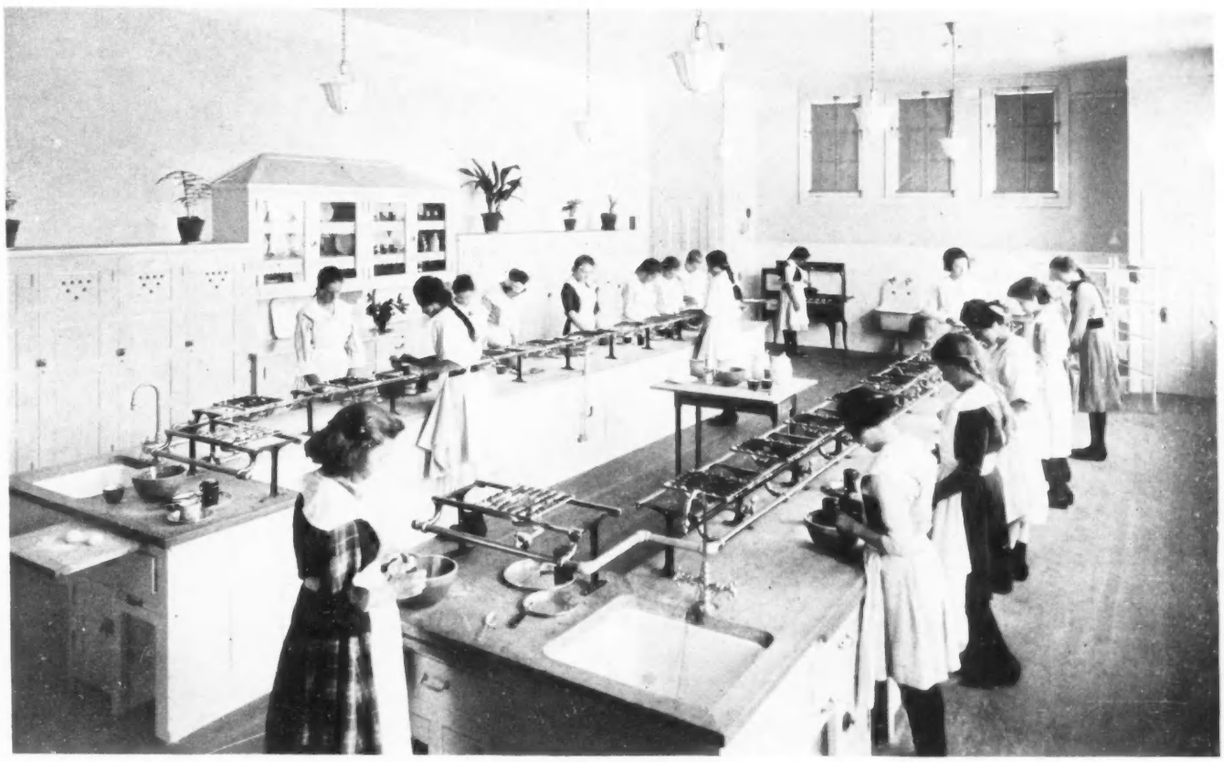


MAIN CORRIDOR

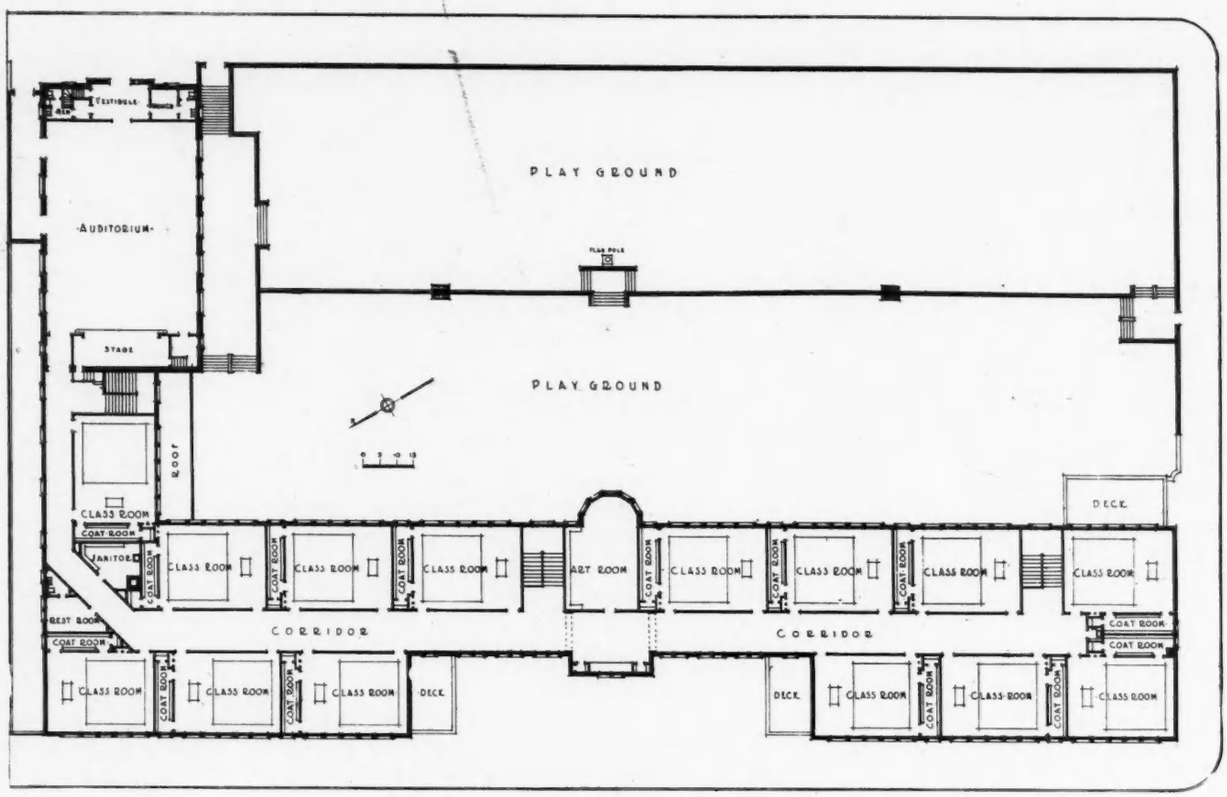


TYPICAL CLASS ROOM
MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA
JOHN REID, Jr., Architect

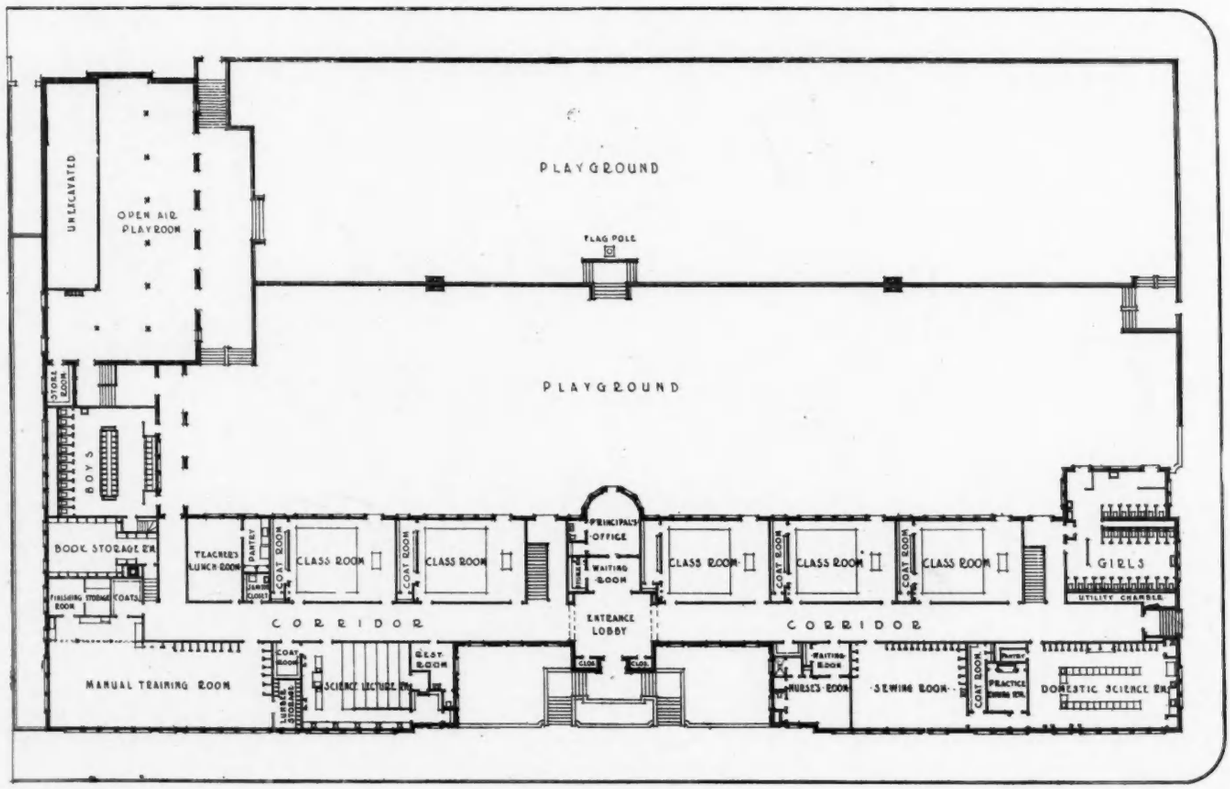
MANUAL TRAINING ROOM



COOKING LABORATORY
MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA
JOHN REID, Jr., Architect



SECOND FLOOR PLAN

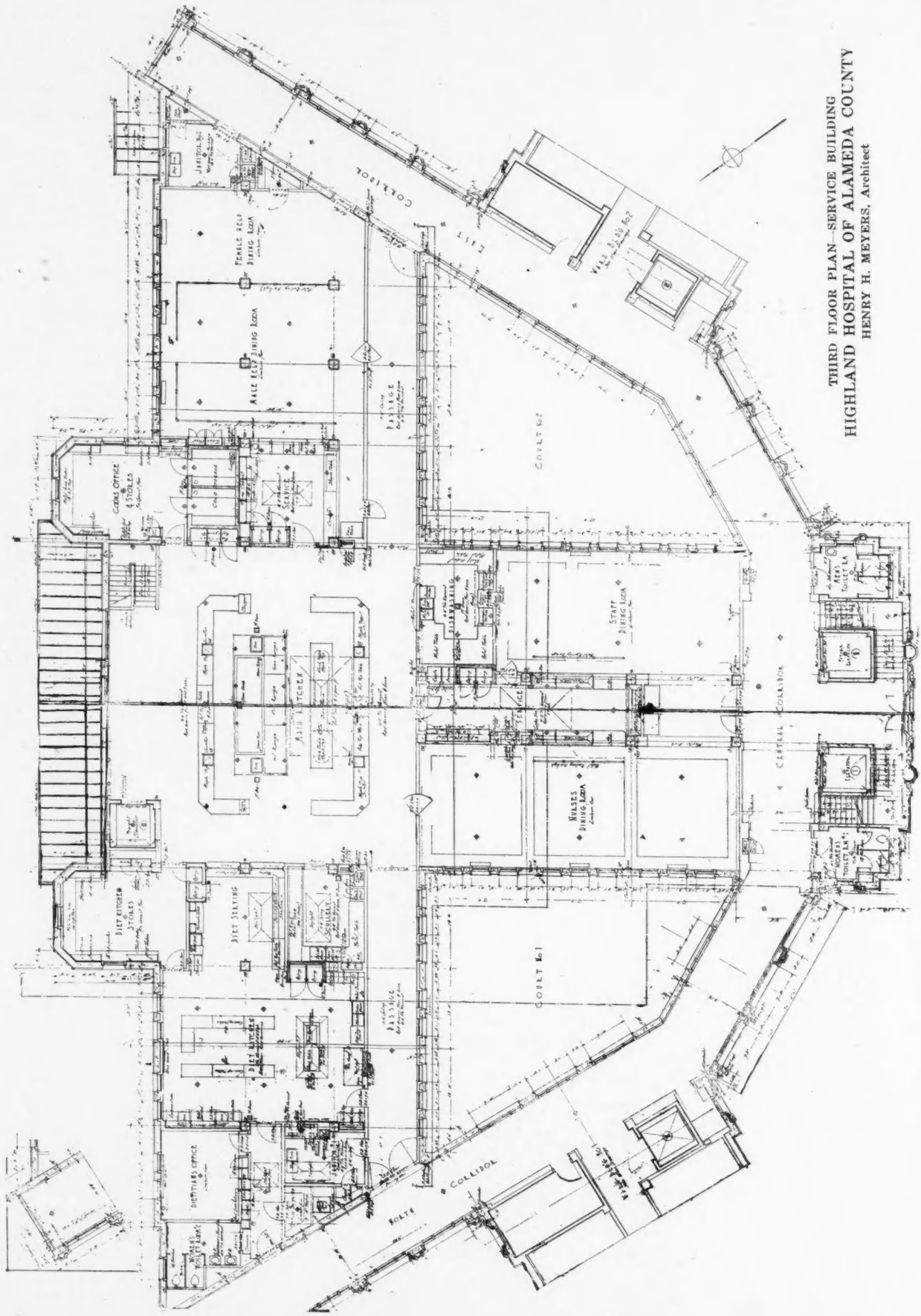


FIRST FLOOR PLAN

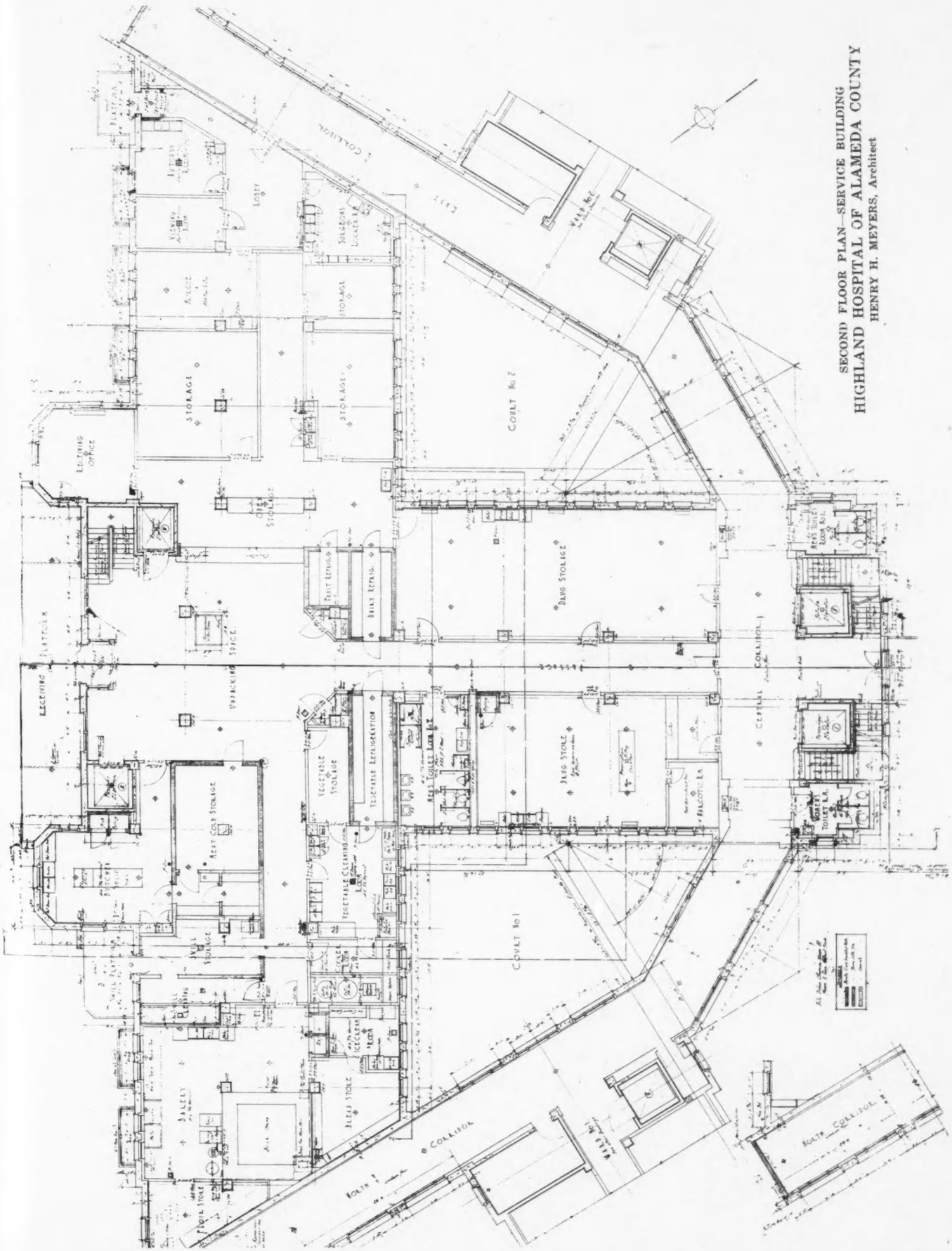
MONROE SCHOOL, SAN FRANCISCO, CALIFORNIA

JOHN REID, Jr., Architect

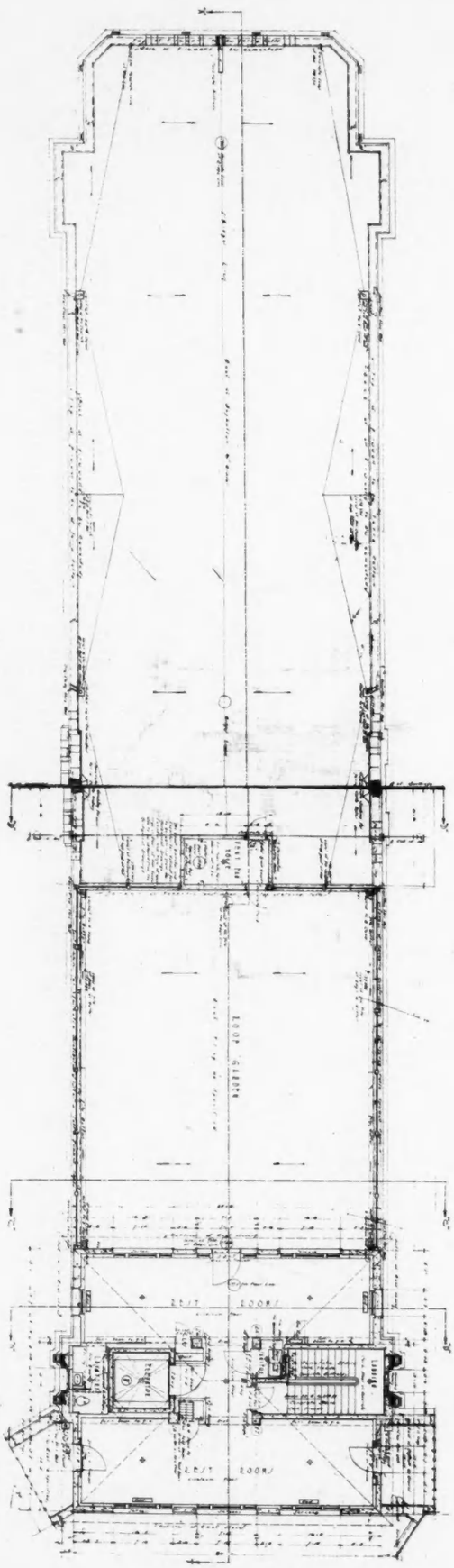
PLOT PLAN
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

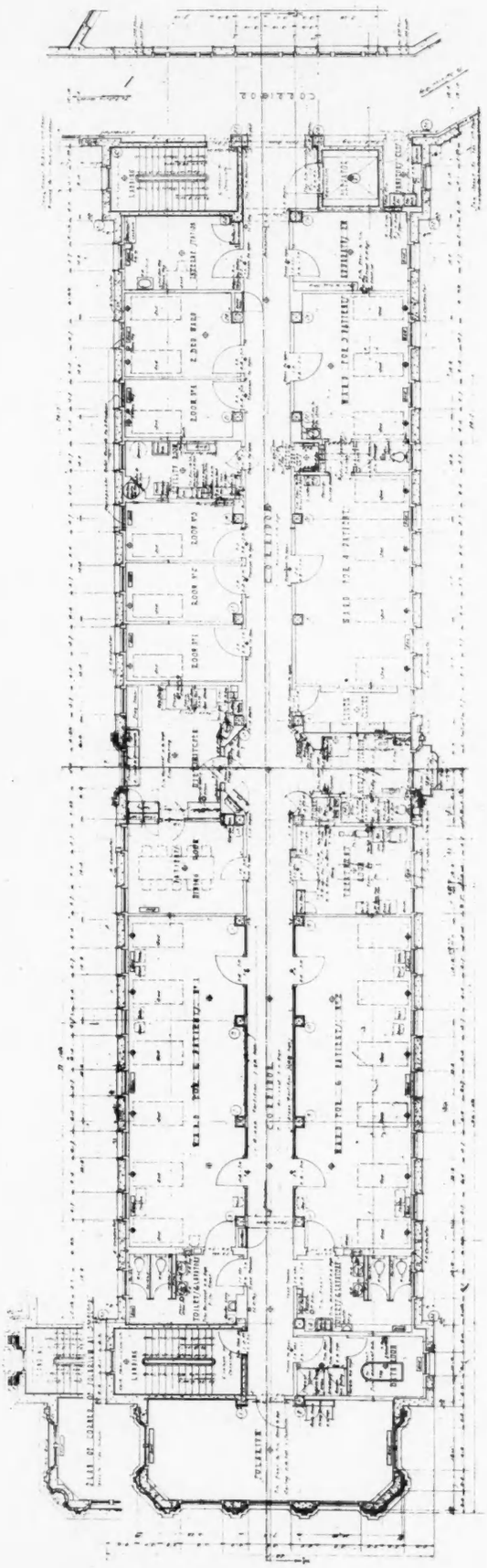


THIRD FLOOR PLAN—SERVICE BUILDING
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect



SECOND FLOOR PLAN—SERVICE BUILDING
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect





UPPER: TYPICAL FOURTH FLOOR AND ROOF PLAN—WARD BUILDINGS
LOWER: TYPICAL WARD FLOOR—WARD BUILDINGS

HIGHLAND HOSPITAL OF ALAMEDA COUNTY

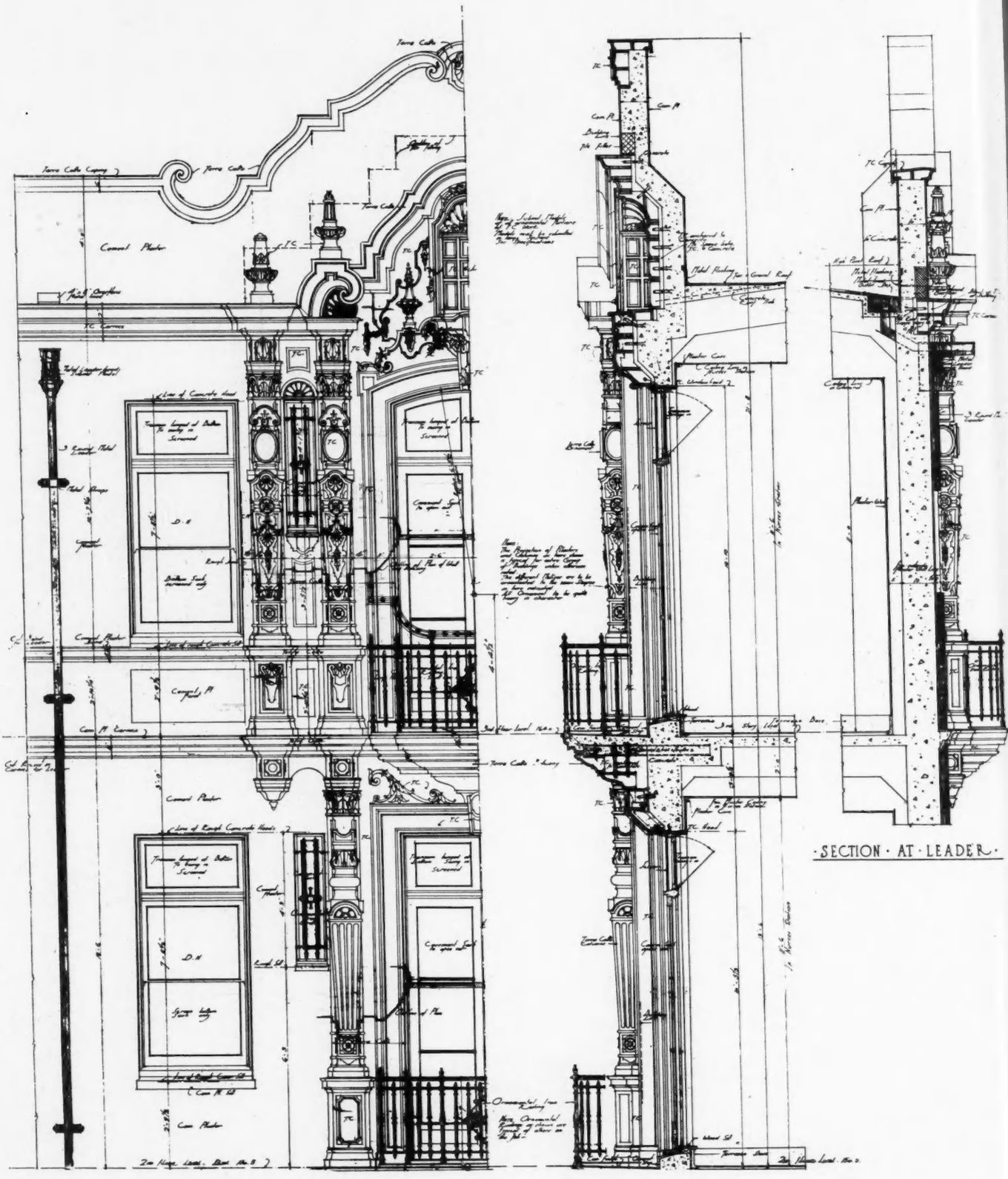
HENRY H. MEYERS, Architect

TYPICAL SIDE ELEVATIONS—WARD BUILDINGS

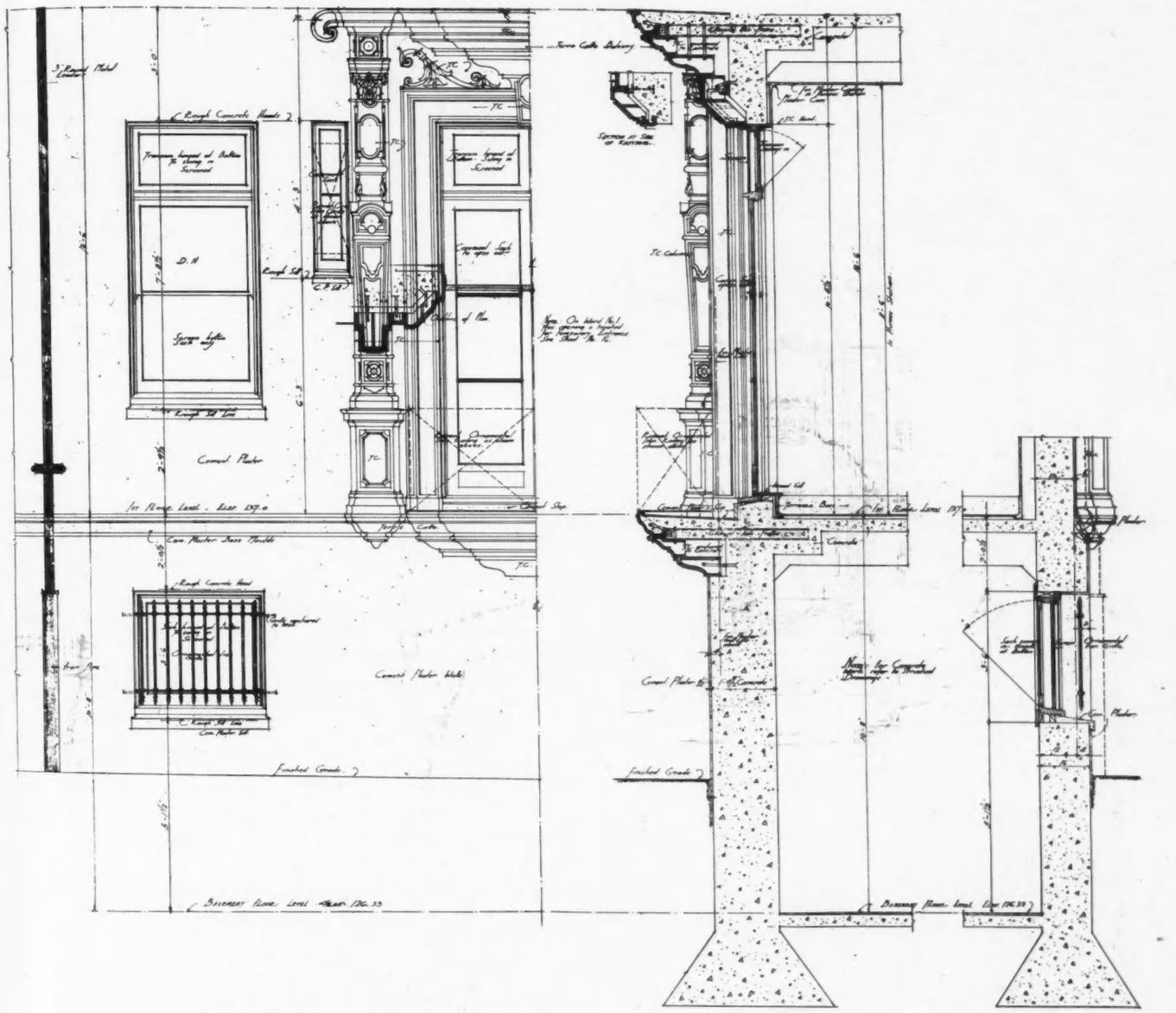
HIGHLAND HOSPITAL OF ALAMEDA COUNTY

HENRY H. MEYERS, Architect

HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect



DETAILS ON WARD BUILDINGS—UPPER STORIES
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

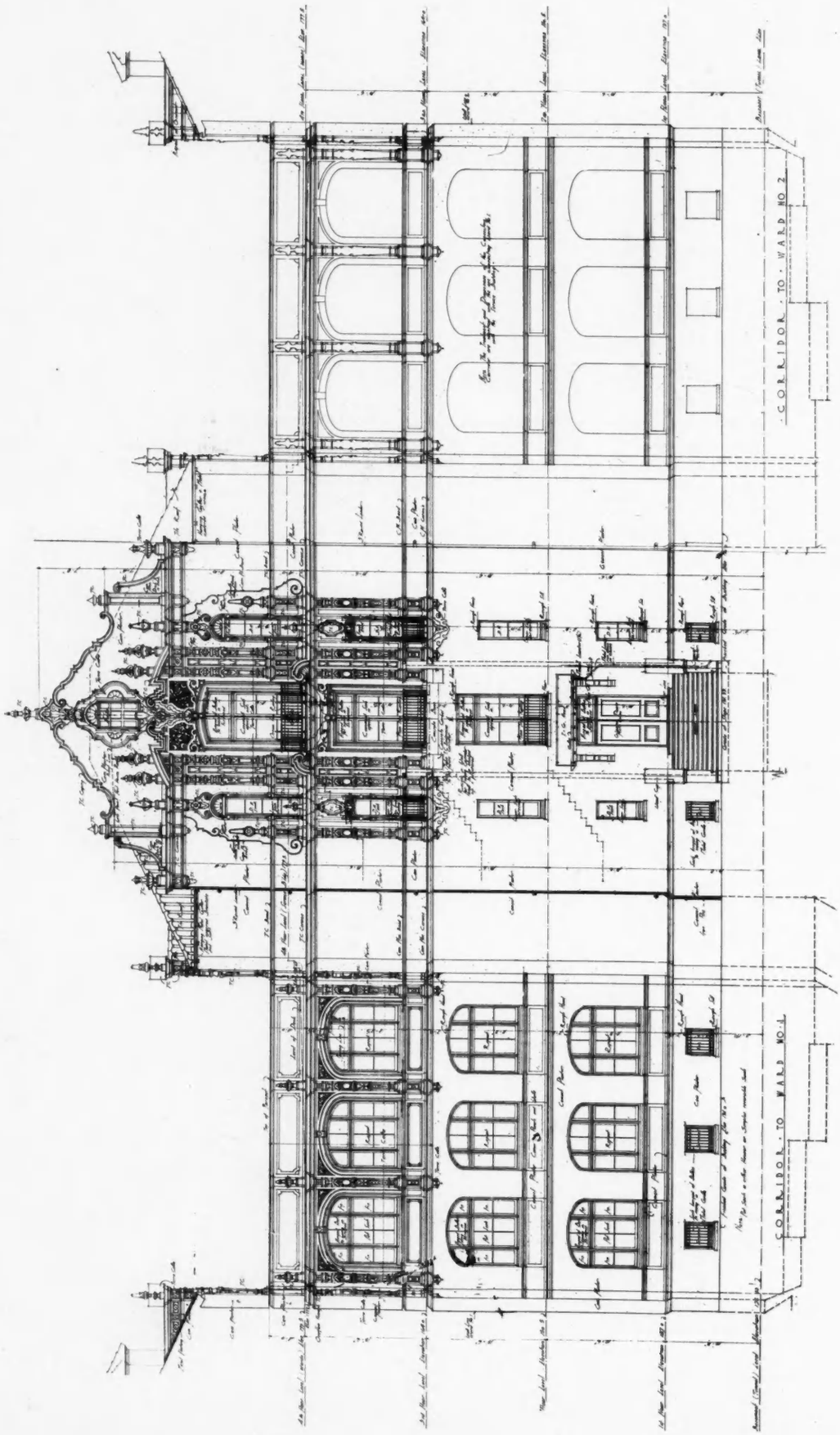


·ELEVATION · OF · CENTRAL · MOTIVE·
·WARD · BUILDING · NO·2·
·FOR · TEMPORARY · TREATMENT · OF · WARD · NO·1 · SEE · SHEET · NO·16·

·SECTION · ON · CENTER-LINE·

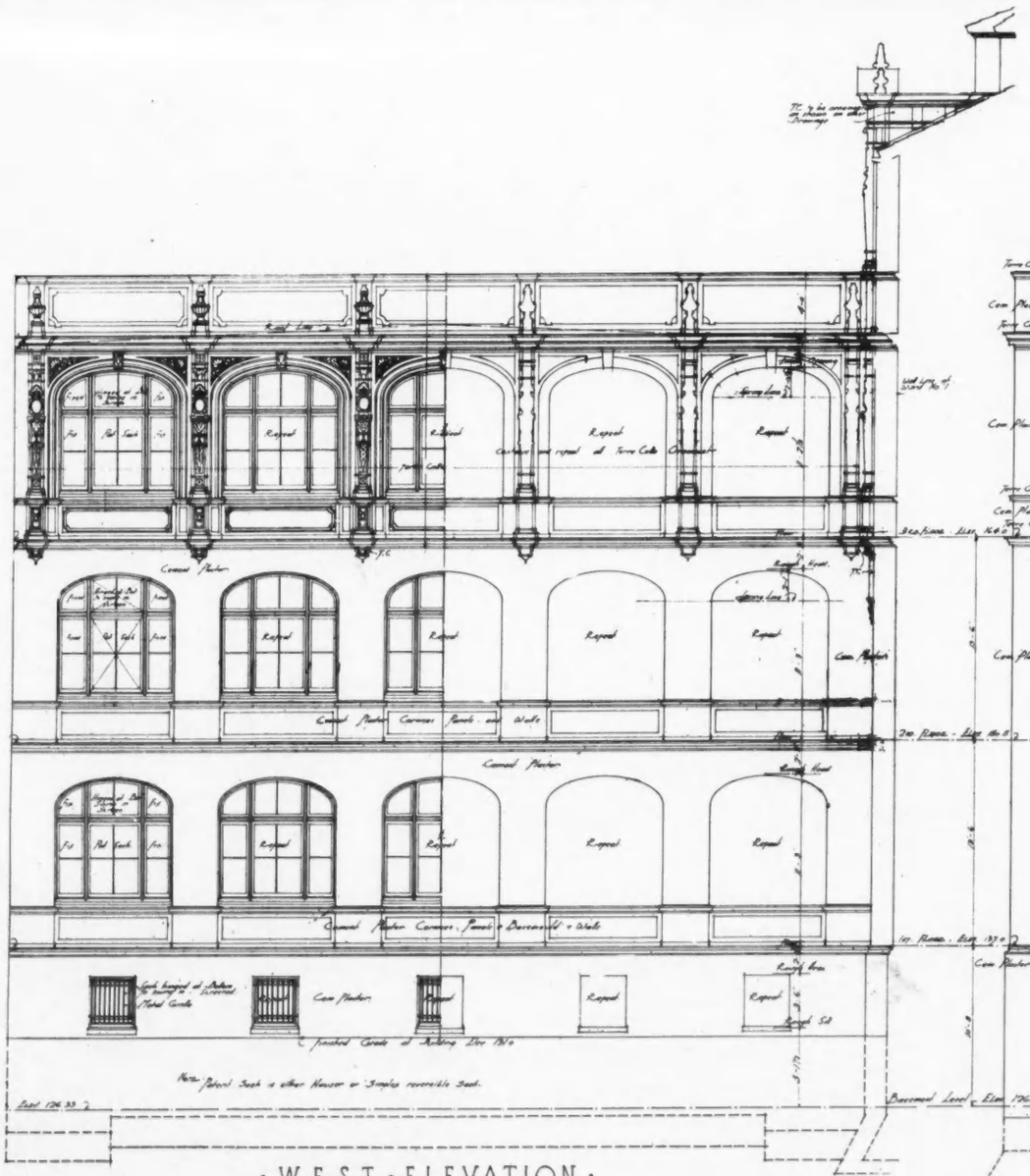
·AT · BASEMENT · WINDOW·

DETAILS ON WARD BUILDINGS—LOWER STORIES
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

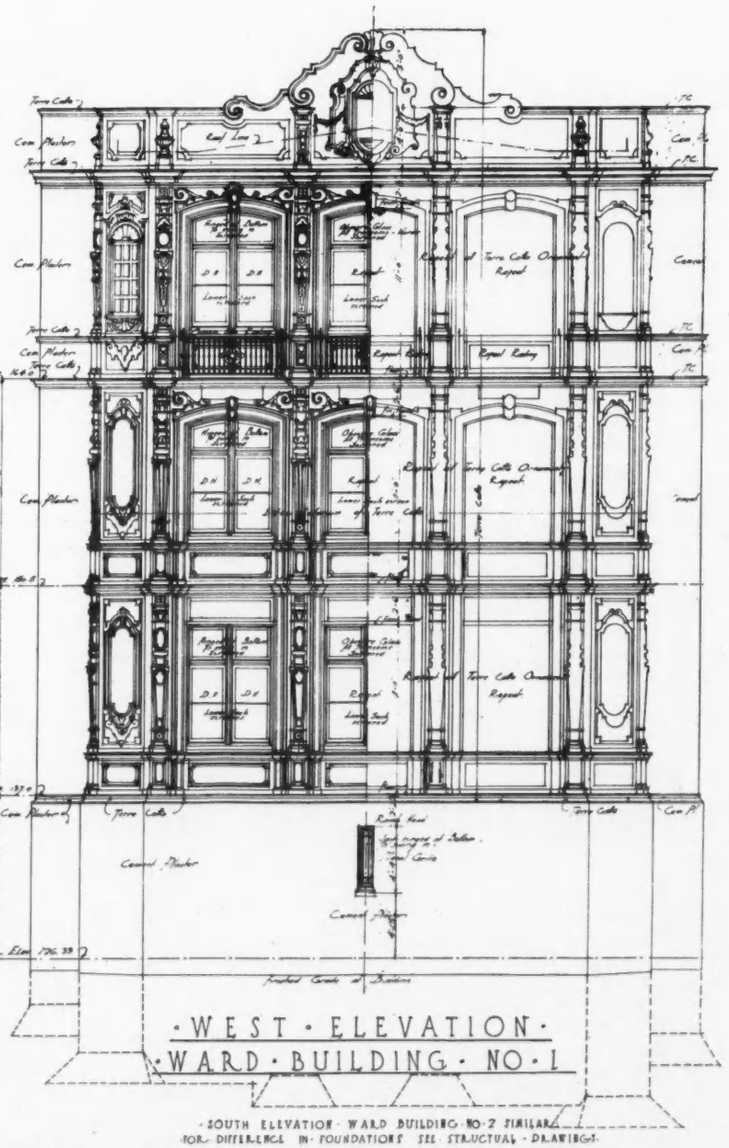


SOUTHWEST ELEVATION—SERVICE BUILDING
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

SOUTHWEST ELEVATION—SERVICE BUILDING
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect



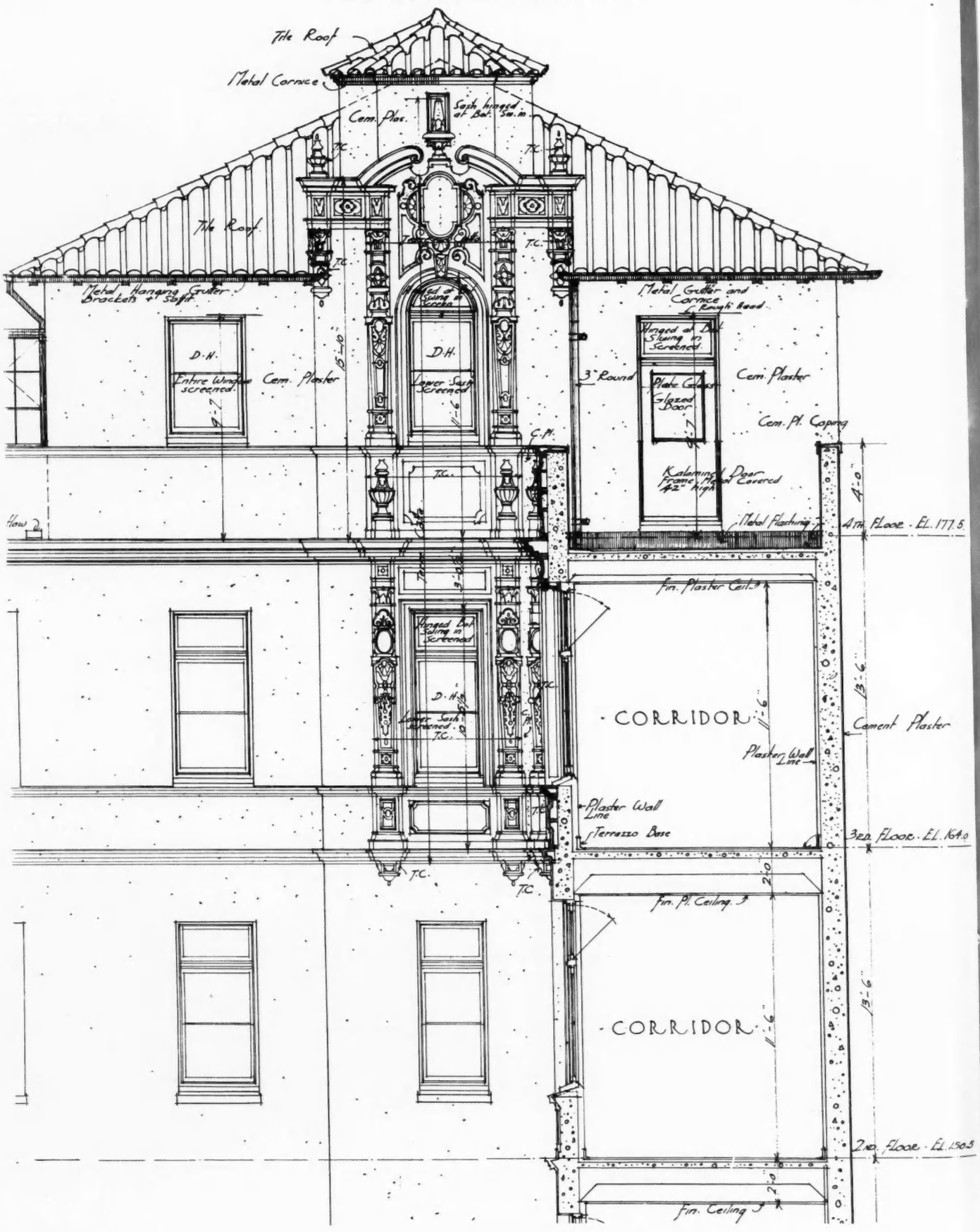
TYPICAL ELEVATION OF CONNECTING CORRIDORS



FRONT ELEVATION OF WARD BUILDING, SHOWING SOLARIUM

HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

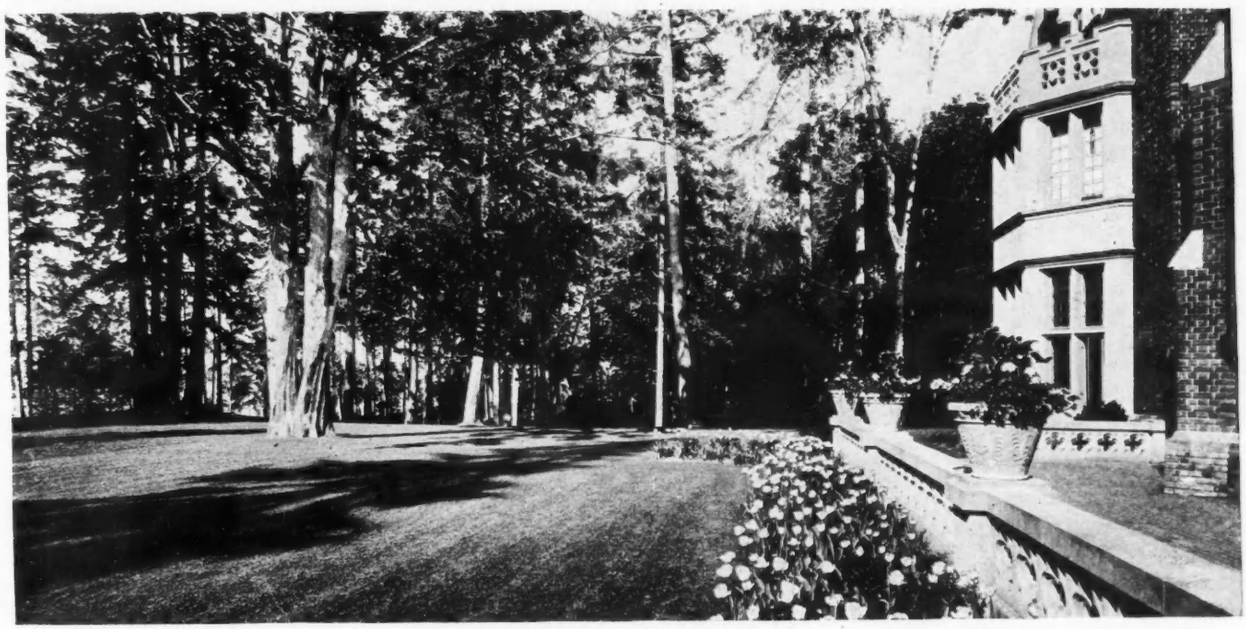
Vol. XIX, No. 2
THE BUILDING REVIEW
Plate 31



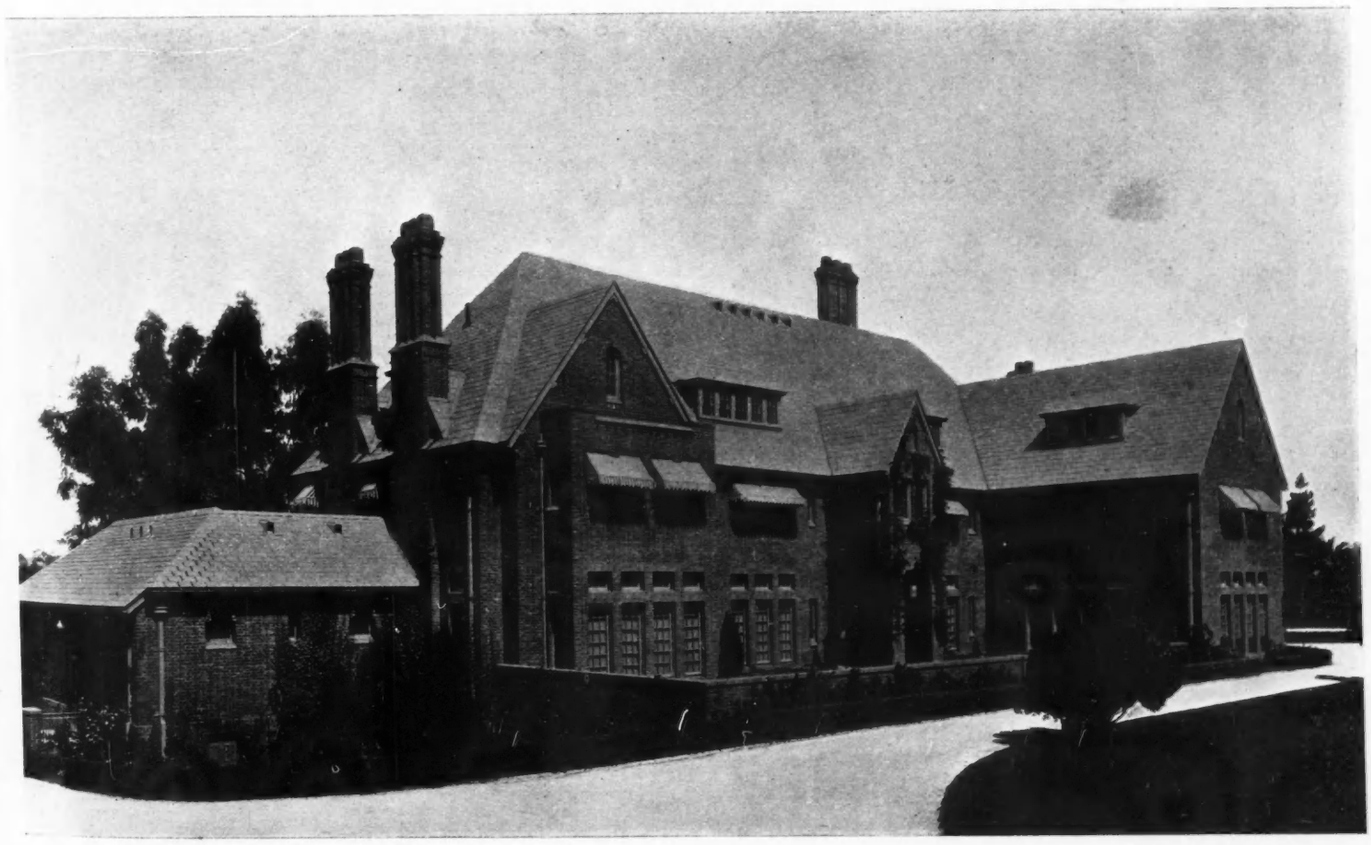
DETAILS ON WARD BUILDINGS—END PAVILION
HIGHLAND HOSPITAL OF ALAMEDA COUNTY
HENRY H. MEYERS, Architect

The HOME BUILDER

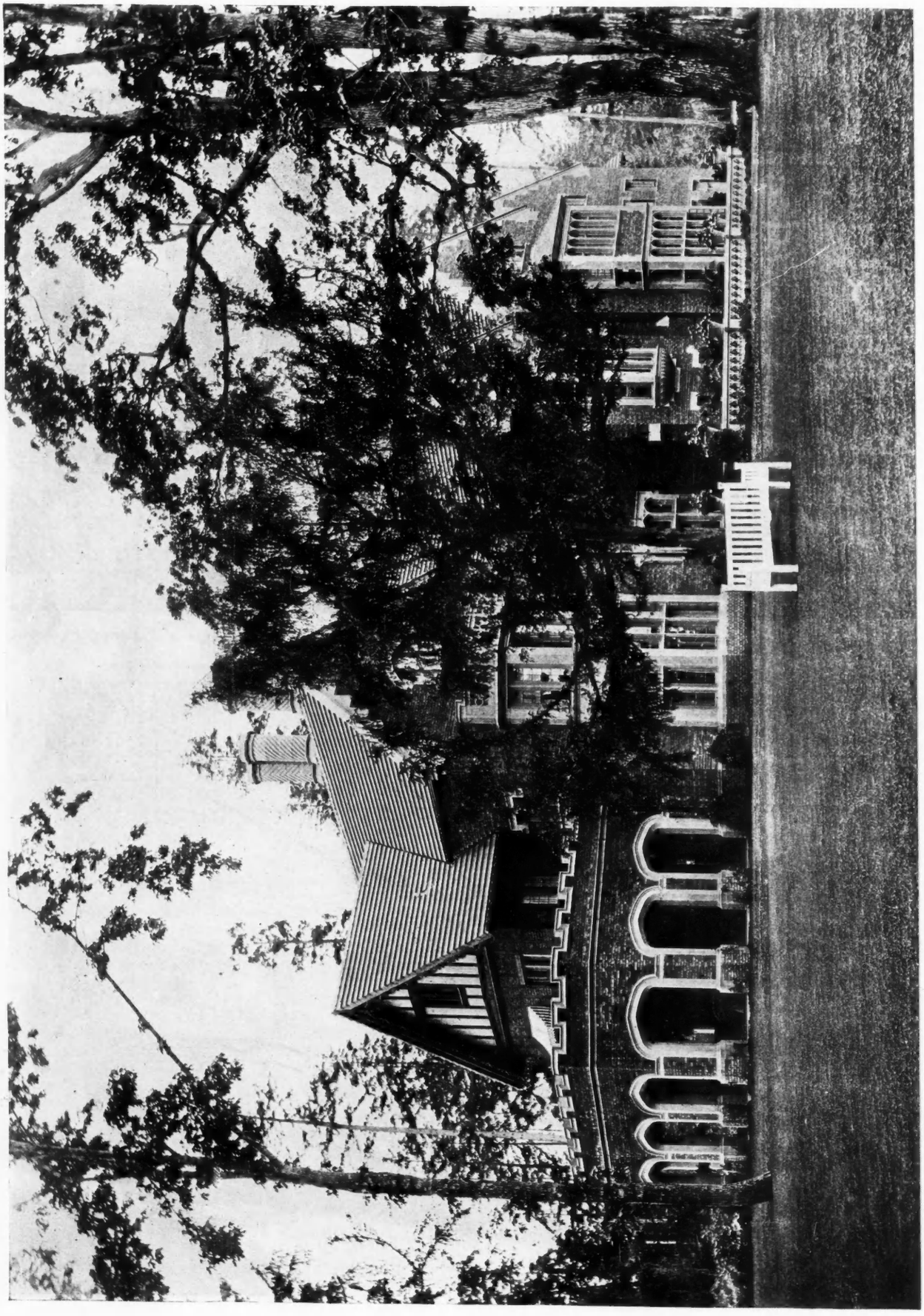
WESTERN EXAMPLES OF THE LARGE BRICK HOUSE



RESIDENCE OF CHESTER THORNE, TACOMA, WASHINGTON — CUTTER & MALMGREN, Architects



RESIDENCE IN SOUTHERN CALIFORNIA — R. D. FARQUHAR, Architect



RESIDENCE OF CHESTER THORNE, TACOMA, WASHINGTON

CUTTER & MALMGREN, Architects

INTERIOR DECORATION

THE PANELED WALL

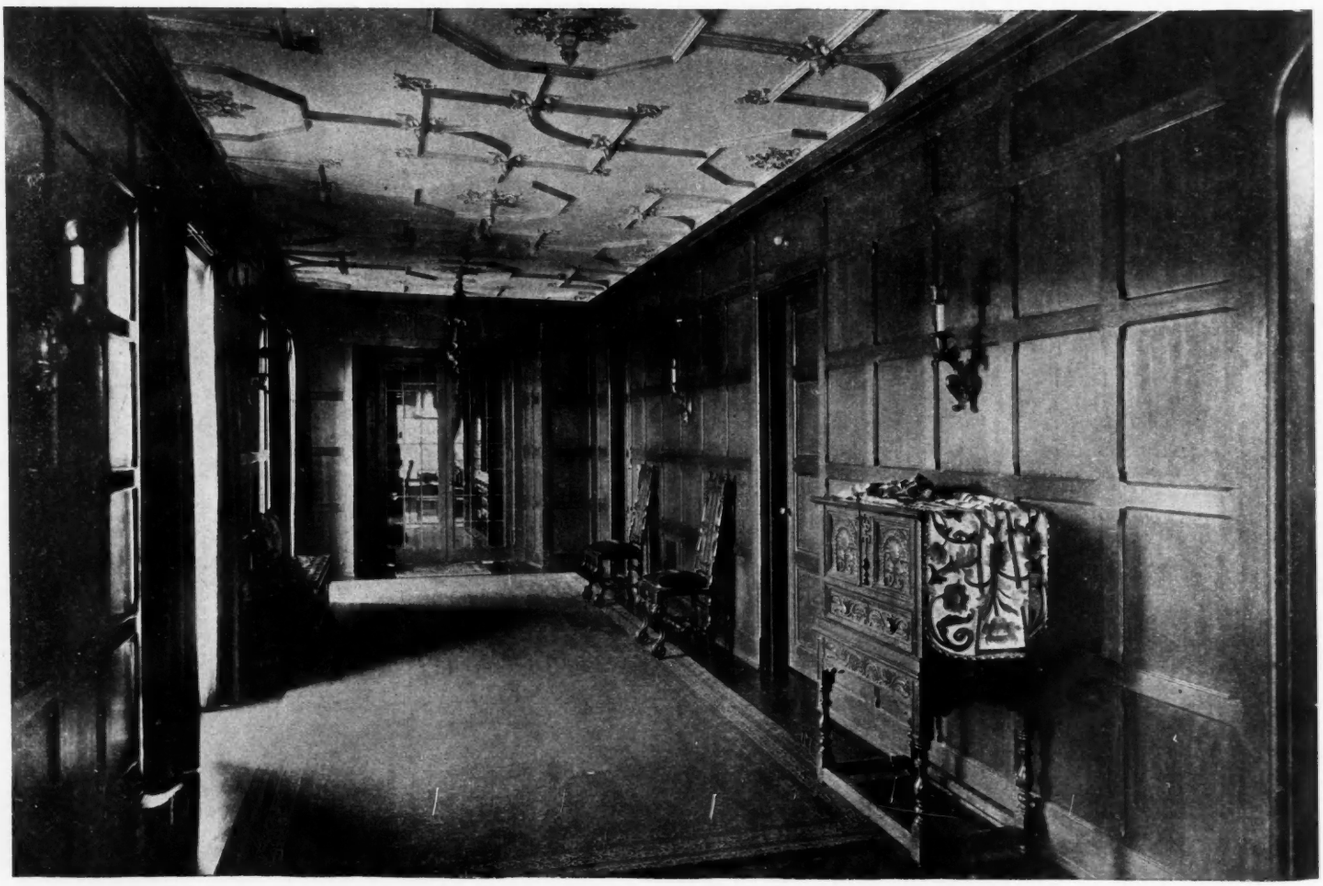
INGLENOOK RECESSED BELOW BALCONY

CUTTER & MALMGREN, Architects

RESIDENCE OF CHESTER THORNE, TACOMA, WASHINGTON

DINING ROOM, RESIDENCE OF FRANK EMERY, PASADENA, CALIFORNIA
ELMER GREY, Architect

HALL, RESIDENCE OF P. T. MORGAN, LOS ALTOS, CALIFORNIA — J. H. POWERS, Architect



HALL, RESIDENCE OF S. S. HINDS, PASADENA, CALIFORNIA — MARSTON & VAN PELT, Architects

OFFICIAL NEWS OF PACIFIC COAST CHAPTER, A. I. A.

SAN FRANCISCO CHAPTER, A. I. A.

The regular monthly meeting of the San Francisco Chapter of the American Institute of Architects was held on Thursday evening, December 18, 1919, at the Architectural Club Rooms, 77 O'Farrell Street, at 7:30 p. m. The meeting was called to order at 7:45 by Mr. Sylvain Schnaittacher, the president.

MINUTES

The minutes of the meeting held on November 20, 1919, were read and approved.

STANDING COMMITTEES

There were no reports from the Standing Committees.

SPECIAL COMMITTEES

Relations to Building Contractors: The Chair instructed Mr. William Mooser, chairman of this Committee on Relations with Contractors, to make a report within two weeks, when a special meeting of the Chapter will be called to consider the same and take action on the method of taking bids and such other matters as are included in the report.

GENERAL BUSINESS

Communications: From Mr. Burton E. Morse, chairman of the Idaho State Post-War Committee on Architectural Practice; from Mr. F. E. Davidson, chairman of the Committee on State Societies, on the planning of putting a state society in operation; from Mr. Henry K. Holsman, secretary of the Post-War Committee on Architectural Practice, on the work of the Executive Council; from National Federation of Construction Industries regarding the standardization and practice of constructive work which this Chapter is planning to undertake; from Mr. E. C. Kemper, Executive Secretary of the A. I. A., relative to the "Statement of Progress of the Post-War Committee"; also one in re Mr. Edgar A. Mathews' resignation.

Membership: On December 12, 1919, the Chapter lost one of its members through death—Mr. Harry L. Cunningham.

The following resolution was offered, seconded and carried:

That the Chapter send condolence to the widow of Mr. Cunningham; also to his partner, Mr. M. V. Politeo, and that a copy of same be spread on the minutes.

NEW BUSINESS

After discussion of the letter from Mr. F. E. Davidson in re State Architectural Society, it was moved and duly seconded that it was the sense of the meeting that this Chapter does not approve the formation of a State Society in California; but, as being a better form of machinery, does endorse the proposed system of regional representation on the Board of Directors of the Institute, and believes that it will have all the good effects of a State society without the disadvantages.

A report by Mr. Smith O'Brien on advertising was read by the chairman, but on account of the absence of Mr. O'Brien no action was taken.

The report of the committee to audit the books of the secretary-treasurer, finding the accounts in order, was received and ordered filed.

There was a general discussion of the "Statement of Progress of the Post-War Committee," but no action was taken.

A resolution was offered by Mr. Mooser and seconded, that a communication be sent to all the Chapter members quoting the provision of the Code of Ethics and Principles of Practice as published by the Institute, in the matter of architects attempting to obtain work on the basis of competition in professional charges. Carried.

ADJOURNMENT

There being no further business before the Chapter, the meeting adjourned at 10 p. m.

Subject to approval ....., 1920.

MORRIS M. BRUCE, Secretary.

MINUTES OF THE ONE HUNDRED AND THIRTY-FIRST MEETING OF SOUTHERN CALIFORNIA CHAPTER, A. I. A.

The one hundred and thirty-first regular meeting of the Southern California Chapter, A. I. A., was held at the City Club, Eighth and Broadway, Tuesday evening, December 11. The meeting was called to order at 7 p. m. by the president, Mr. Patterson, the following members being present: J. E. Allison, J. J. Backus, A. B. Benton, G. E. Bergstrom, F. P. Davis, Theodore Eisen, A. M. Edelman, R. G. Hubby, J. P. Krempel, A. C. Martin, S. B. Marston, Octavius Morgan, Robert H. Orr, H. M. Patterson, A. W. Rea, A. F. Rosenheim, G. B. Van Felt, Jr., A. Wackerbarth, H. F. Withey. As guests were present Mr. Mickeljohn, J. C. Hillman, Walter S. Davis and John Bowler.

Upon the suggestion of Mr. Rosenheim, the business of the evening was postponed in honor of the guests, and the president introduced Mr. Mickeljohn, who spoke very interestingly and at length upon the life and political conditions in Mexico, as has existed in the past five years. Following which the minutes of the 130th meeting were read and approved,

Under "Committee Reports," Mr. Withey of the City Planning Committee stated that there had been held two conferences of the City Planning Committees of the Chamber of Commerce, Municipal League, City Club, City Planning Association, Southern California Chapter and other societies, together with the members of the City Council, and as a result resolutions had been sent and requests made upon the Council to appoint a commission of fifty to take up city planning. Mr. Withey stated further that at the present time the City Attorney has an ordinance practically drafted; that all members of the Council are in favor of the commission, and very probably a city planning ordinance will be adopted and the commission appointed at an early date.

Mr. Rosenheim of the special committee appointed at the October meeting rendered a report on the work performed in the last month relative to the program for selecting meritorious architectural work in the city. After a general discussion it was moved by Mr. Morgan, seconded and passed, that the Chapter endorse the program and that the committee proceed with its plan as called for by the program, reporting at the next meeting the amounts of such funds as will be necessary for the undertaking.

Upon the secretary calling attention of the members that at this time delegates should be chosen for the next Institute Convention, it was moved by Mr. Edelman, duly seconded and carried, that the selection of delegates be postponed until it has been learned definitely when and where the convention for 1920 will be held.

Under "Communications" the following were read:

From John S. McGroaty, accepting an invitation to be present as a guest of the Chapter some time after February 1.

From Mr. Silas Evans, president of Occidental College, tentatively accepting an invitation to be the Chapter's guest some time after the first of the year.

From E. C. Kemper, executive secretary of the Institute, relative to the Institute desiring to foster public sentiment in favor of the creation of a department of public works. Said letter was accompanied by a circular giving details of this plan. Letter was ordered filed.

From E. C. Kemper as to the progress of the Post-War Committee, enclosing report, etc. Same was ordered filed.

From Charles Whitaker, editor of the Journal, stating that he would be visiting Los Angeles on or near the 21st of January and desired a meeting of the Chapter at that time. It was moved and duly voted that the president and secretary make arrangements for this meeting.

Annual election of officers being the next item on the program, the secretary read the report of the nominating committee made at the last meeting. There being no other nominations made, it was moved by Mr. Edelman, seconded by Mr. Kempel and duly passed, that the secretary cast the ballot. Whereupon the president declared the following officers elected to office: C. E. Bergstrom, President; H. F. Withey, Vice-President; R. G. Hubby, Secretary; August Wackerbarth, Treasurer; A. M. Edelman, member of the Executive Committee.

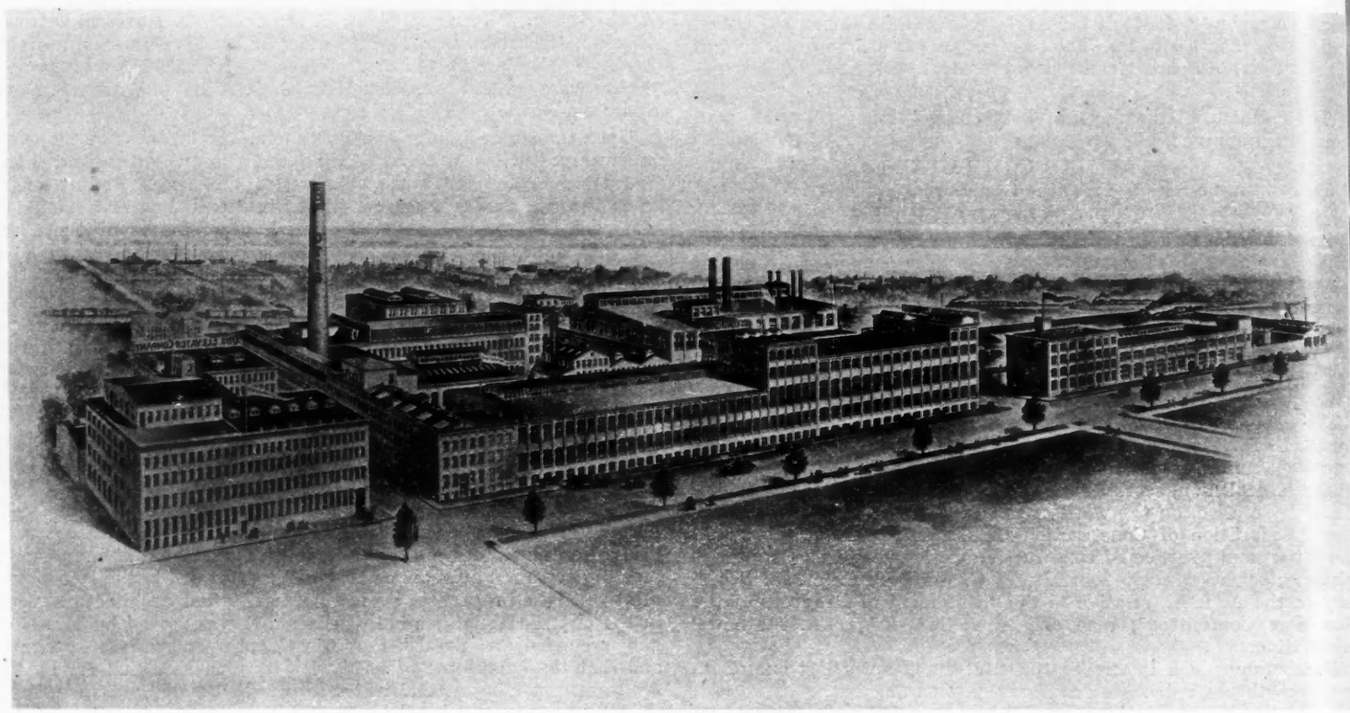
The secretary reported an invitation given by the Washington Iron Works to the Chapter to visit its manufacturing plant, and it was voted that the next regular meeting be held there.

The meeting adjourned at 10:30.

H. F. WITHEY, Secretary.

The MANUFACTURER

OTIS ELEVATOR COMPANY



MAIN OTIS ELEVATOR PLANT AT YONKERS, NEW YORK

THE birth of the power elevator for freight and passenger service took place about the middle of the nineteenth century. Elisha Graves Otis, one of the earliest elevator inventors, and the founder of the Otis elevator industry, began his investigations in 1854. Since that time the history of the elevator business has paralleled that of the Otis Elevator Company.

Mr. Otis was born August 3, 1811, in the village of Halifax, Vermont. When he reached the age of nineteen, he left his father's farm and turned his attention to mechanical pursuits. For a time he pursued the trade of blacksmith and later engaged in the manufacture of wagons and carriages. In 1849 he became superintendent for the "Bedstead Factory" at Hudson City, N. J.

It is interesting to note that Mr. Otis' entry into the elevator business was, in a sense, accidental. While erecting some new buildings for the "Bedstead Factory," which had removed to Yonkers, N. Y., in 1852, he found it necessary to construct an elevator in one of the buildings. In designing this elevator he began work on some original devices, particularly a ratchet safety. The elevator attracted the attention of some New York manufacturers and Mr. Otis received contracts for building two others. He continued building elevators of this type for a year and then started a manufacturing business of his own in a little shop at Yonkers on the banks of the Hudson, near the present plant of the Otis Elevator Company. Figure 1 shows a picture of this plant, and the contrast between this and the present main factory should be noted.

With Mr. Otis, safety was a matter of devotion. He realized that the whole question of the elevator's existence and progress rested on the extent to which elevators were made safe, and even when not demanded by the purchaser, his elevators were invariably equipped with safety devices. At the opening of the International Industrial Exhibition in the Crystal Palace, New York, in 1853, Mr. Otis placed a small elevator on exhibition, which embodied the improvements he had made up to that time. By way of showing his absolute confidence in his safety device, he stood upon the platform, which had been raised to a considerable height, and cut the ropes. The safety device arrested the fall of the platform without injury to him and thus demonstrated the reliability of the first elevator safety device.

In 1861 the management of the business was assumed by Mr. Otis' two sons, Norton P. and Charles E., under the name of N. P. Otis & Brother, which name was later changed to Otis Brothers & Company. During the Civil War their business was seriously retarded, but the Otis brothers persevered and soon won their uphill fight, increasing their business to such an extent that in 1868 extensive enlargements in the Yonkers plant became necessary.

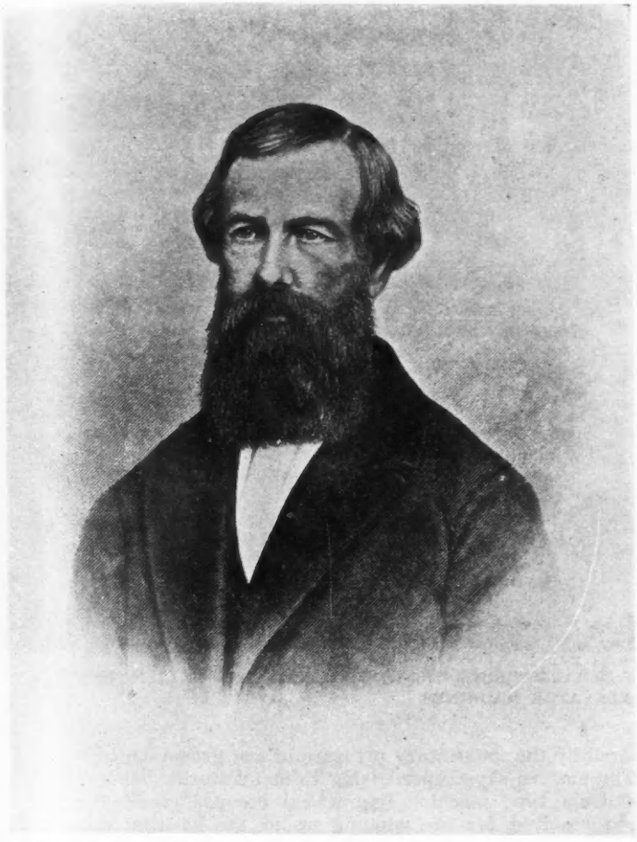
An interesting side light on the history of the elevatory industry is the invention, in 1859, by Otis Tufts, a Boston engineer, of an elevator which he called a Vertical Steel Screw Railway. One of these was installed in the Fifth Avenue Hotel and attracted a great deal of attention. This type of elevator, however, proved to be so expensive as to be almost prohibitive, the cost of this installation being about $40,000.

The history of the elevator industry may be divided, according to the power used to drive the elevators, into four periods, namely, belt, steam, hydraulic and electric.

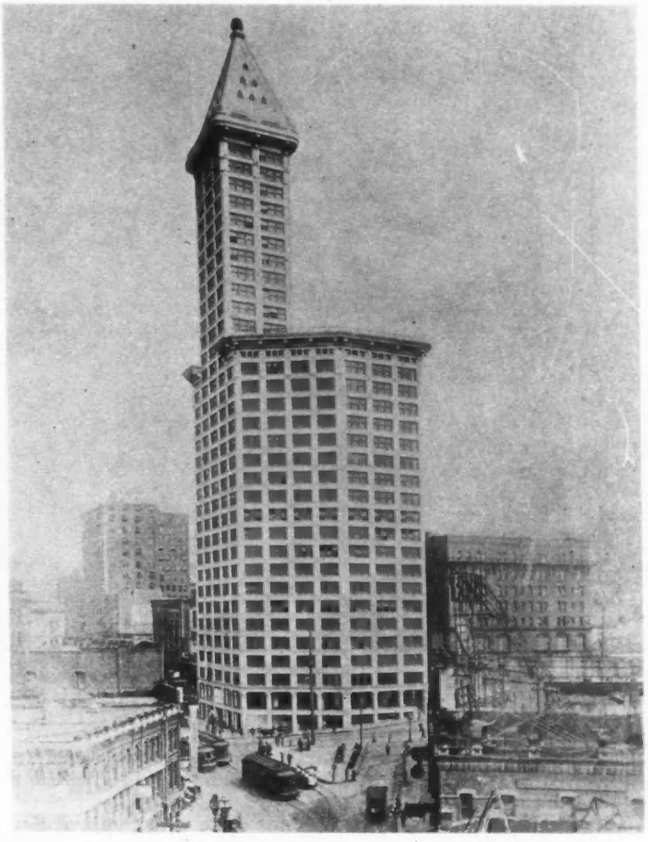
The earliest machines were of the belt-driven type and until 1877 these were used for all ordinary factory service and steam-driven machines were employed for heavy freight and passenger service.

In 1877, however, Otis Brothers & Company made a radical departure in the elevator industry by the introduction of the hydraulic elevator. This machine possessed many advantages over the steam type, the principal advantage being that of greater speed.

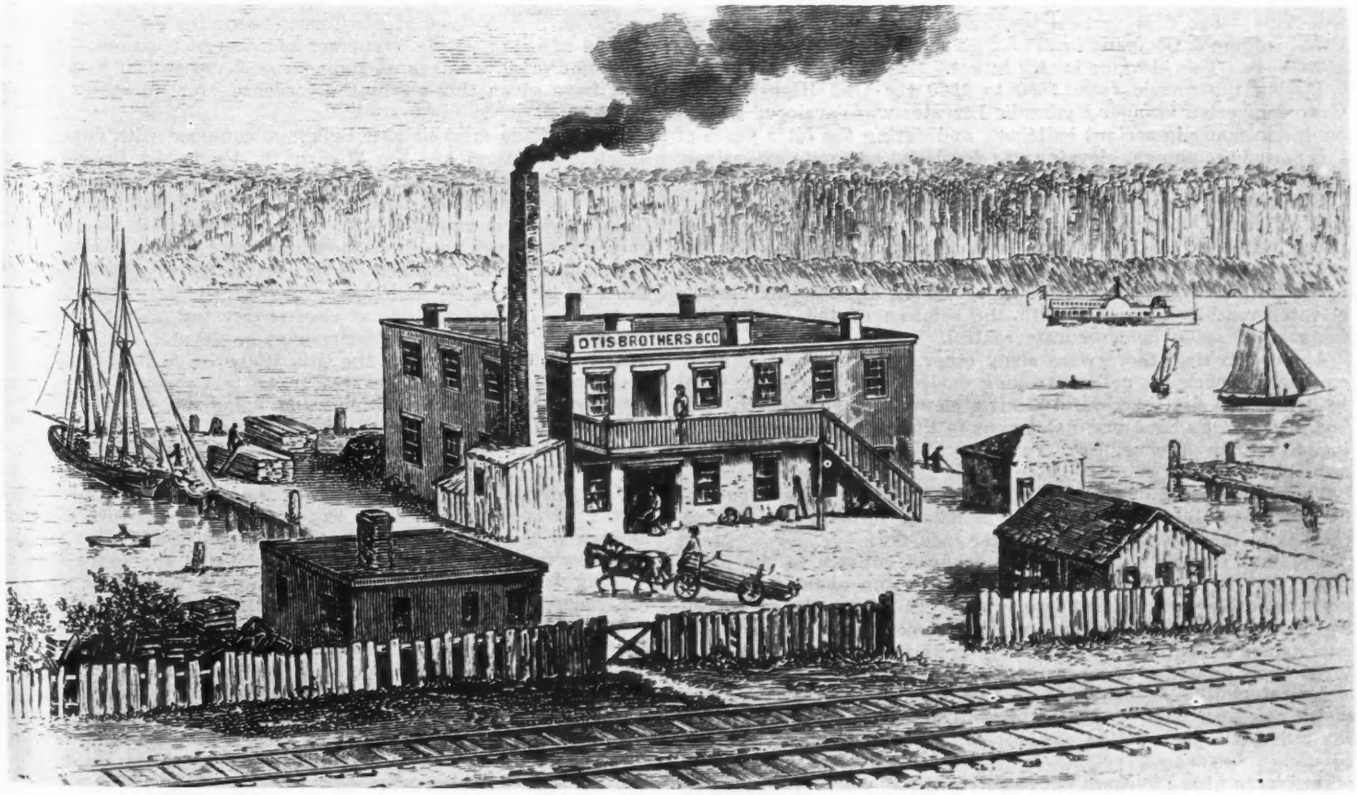
In its first simple form, the hydraulic elevator consisted of a ram supporting the carrying platform. The ram was worked up and down by water being forced into or ejected from a closed cylinder surrounding the ram. Following this type came the geared hydraulic machine. In this type the cylinder was retained but the ram was discarded in favor of a piston which traveled but a portion of



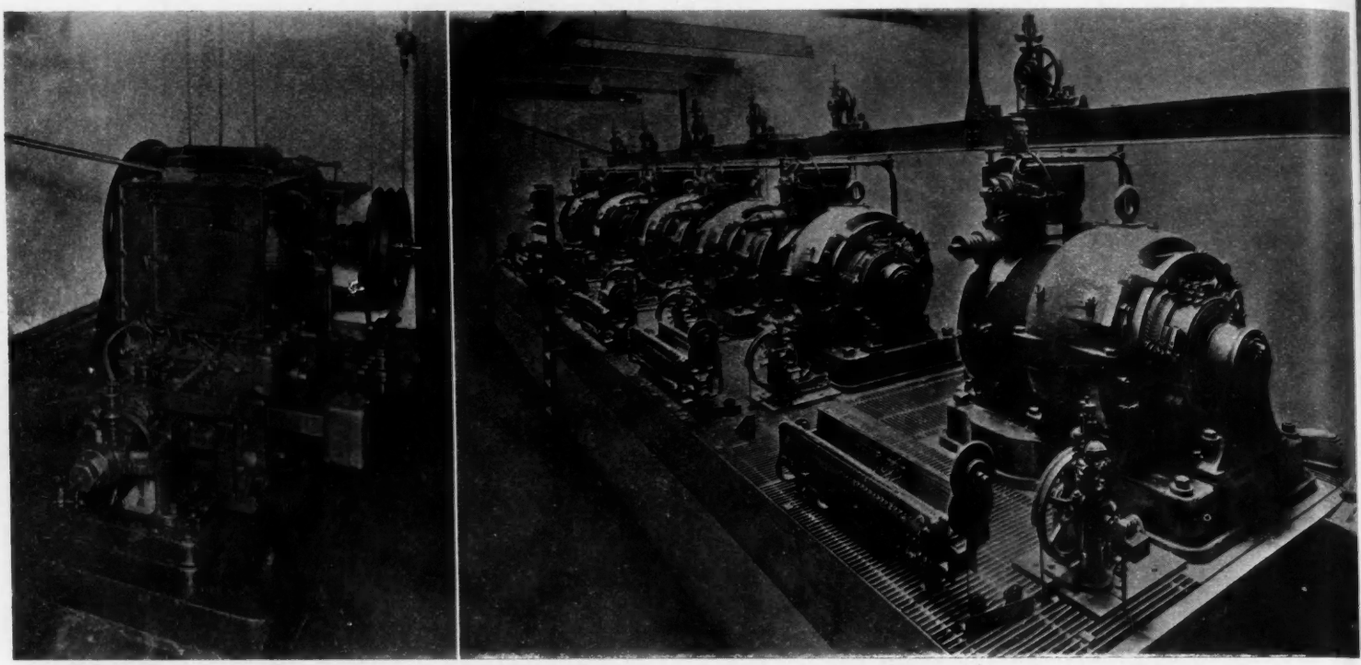
ELISHA GRAVES OTIS, FOUNDER OF THE OTIS ELEVATOR INDUSTRY



L. C. SMITH BUILDING, SEATTLE, EQUIPPED WITH EIGHT OTIS GEARLESS TRACTION ELEVATORS



THE FIRST OTIS FACTORY, STARTED IN 1853 AT YONKERS, NEW YORK



THE FIRST SUCCESSFUL ELECTRIC ELEVATOR, INSTALLED BY OTIS CO. IN DEMAREST BUILDING, NEW YORK, IN 1887, STILL IN OPERATION, AND A BATTERY OF MODERN ELEVATOR MACHINES

the distance traveled by the car. Cables were passed around multiplying sheaves and connected to piston and car to give the necessary car travel.

The next development in the elevator came with the invention of the vertical hydraulic machine, and for many years this type was the standard for passenger service. The vertical hydraulic elevator was invented by Mr. Cyrus W. Baldwin, who joined with Otis Brothers & Company in 1875, and whose patents were acquired by them at this time. The first vertical hydraulic machine was installed by Otis Brothers & Company in the St. Stevens Hotel, Eleventh Street, New York. This elevator is still in use.

During the decade from 1890 to 1900 the Otis High-Pressure Geared Inverted Plunger Hydraulic Elevator was developed and installed in many important buildings, and during the later years of this period the plunger elevator was developed and quite extensively used.

But even as the hydraulic elevator progressed in speed and general efficiency, electricity began to be widely used for lighting and power purposes. Otis Brothers & Company, anticipating the use of electricity as a driving power for elevators, directed their efforts towards the development and production of an efficient electric elevator machine, together with the solution of the complicated features of safety and accurate control.

About this time there were many other concerns experimenting on electric machines and controlling devices, but it was not until 1889 that the first successful electric elevator was completed and installed by Otis Brothers & Company in the A. T. Demarest Building, 335 Fifth Avenue, New York City. This elevator is still in operation.

The development of the electric elevator and its tremendous influence on the increasing height of buildings forms an interesting chapter in the history of the elevator industry.

The first electric machines were confined entirely to the drum type; that is, a machine with a grooved drum about which the hoisting cables of the car are wound, the drum being driven through a worm and gear by an electric motor. In its perfected and refined design this type of elevator is widely used today in a great many buildings of moderate height.

An interesting development of this type of machine, and one which has been lately extended to the traction elevator as well, is the automatic push button elevator, which is particularly adapted to use in residences, private institutions, apartment houses and other places where intermittent service prevails and where an operator is not desired. This type of elevator is operated by means of a series of push buttons, which enables the passenger to call the car from another floor and, after entering, travel to any floor desired by the momentary pressure of the proper button.

The modern skyscraper, rising to many stories, made the use of the drum type machine impractical because of the tremendous drum required for the winding up of the hoisting cables. The necessity of an electric type of elevator to meet the increasing height of buildings brought about the development of the geared traction elevator, and out of this was evolved the gearless traction elevator, which represents the latest and most efficient elevator in use today. This type of machine is noted for its simple, compact design and its starting, stopping, and control features. These and many other advantages, including speeds up to 700 feet per minute, have given this elevator precedence over all others for skyscraper service.

Some of the most notable buildings equipped with Otis gearless traction elevators are the Woolworth, Equitable, Bankers Trust, Singer, and Metropolitan buildings of New York. On the Pacific Coast the tallest skyscraper is the L. C. Smith Building in Seattle. This building is equipped with eight Otis gearless traction elevators, one of which travels to the thirty-third floor, a distance of 370 feet, and another of which travels to the thirty-fifth floor, a distance of 390 feet.

Another interesting type of electric elevator, and one which constitutes the most radical development in elevator design in recent years, is what is known as the Otis Micro Drive Push Button Control Elevator. The principal feature of this elevator is the microleveling device, which automatically holds the elevator platform level with the landing floor, irrespective of load conditions. This elevator has been used principally for freight service, but is coming to be applied to all types of elevators for both passenger and freight service. Every operation of the elevator is entirely automatic. It is not too much to say that in the near future we may be spared the injunction, "Watch your step," which we so often hear now when leaving or entering an elevator, for with the microleveling device the elevator will automatically make an exact landing, independently of the operator in the car.

In 1898 Otis Brothers & Company, the Crane Elevator Company and several other elevator manufacturers consolidated and formed the present Otis Elevator Company. To facilitate the construction and maintenance of elevators in all parts of the United States, district offices were established in various sections. Under the jurisdiction of these offices 119 branch offices have been opened, until now every elevator user is within reach of some Otis service office. The company has also extended its policy of expansion to the foreign field, and practically every country in the world is now served by one or more of its eighty foreign offices.

The organization of the Pacific Zone, with headquarters at 2300

Stockton Street, San Francisco, was made in 1912. Branch offices have been established at Los Angeles, Oakland, San Diego, Sacramento, Fresno, Stockton and San Jose, California; Portland, Oregon; Seattle, Tacoma and Spokane, Washington; Salt Lake City, Utah; Boise, Idaho; and Butte, Montana.

Over 10,000 elevators have been installed on the Pacific Coast and of these over 3000 are in San Francisco.

One of the prominent features of the Otis organization is its periodical inspection service. Under this service, trained elevator inspectors make thorough examinations of elevators weekly, semi-monthly, or monthly, and see that each part is properly cleaned, adjusted and lubricated. Whenever a wearing part shows deterioration the owner is promptly advised, so that he may make provision for replacement before damage or breakage occurs. This inspection has been proven economical and efficient. Its popularity is attested to by the fact that at the present time over 2300 elevators on the Pacific Coast are under the care of Otis inspectors.

The advantages to be found in the Otis nation-wide sales and service organizations will be appreciated by every architect, builder and elevator user. Otis offices can be reached at all hours of the day and night and on Sundays and holidays, so that they offer a continuous, dependable service that embraces expert sales engineers, repairmen and inspectors. No matter where the architect may be situated, he will find an Otis office accessible.

The Otis Elevator Company invites architects to call upon it when laying out their elevator requirements and will gladly give the benefit of its experience and engineering facilities to work out plans for proper equipment and economical space arrangements.

The CONTRACTOR

BUILDING STATISTICS OF SAN FRANCISCO AND OAKLAND, CALIFORNIA, FOR 1919

COMPILED BY MUNICIPAL BUILDING DEPARTMENTS

SAN FRANCISCO

CLASS OF BUILDING	NUMBER	COST
A	22	$1,708,295.00
B	20	1,402,681.00
C	170	3,820,660.00
Frame	1098	4,968,942.00
Alteration	4023	2,767,028.00
Public	12	188,282.00
Harbor Commission	18	307,354.00
Total	5363	$15,163,242.00

OAKLAND

CLASS OF BUILDING	NUMBER	COST
A and B	58	$1,534,944.00
C	57	333,812.00
Frame	2836	4,632,031.00
Alteration	1108	633,785.50
Total	4059	$7,134,572.50

COMPARATIVE STATISTICS, 1916—1919

SAN FRANCISCO

	1916	1917	1918	1919
Class A—				
Number	24	12	6	22
Cost	$3,108,535	$1,232,000	$517,000	$1,708,295
Class B—				
Number	24	20	14	20
Cost	$1,545,742	$1,944,000	$998,700	$1,402,681
Class C—				
Number	148	145	112	170
Cost	$2,928,937	$2,939,554	$2,158,022	$3,820,660
Frame—				
Number	1787	965	442	1098
Cost	$6,561,000	$3,549,698	$1,561,973	$4,968,942
Total Number	1983	1142	574	1310
Total Cost (New Work)	$14,144,214	$9,665,252	$5,235,695	$11,900,578

OAKLAND

(Total—All Classes)

	1918	1919
Number	2948	4059
Cost	$5,382,159	$7,134,572

REFERENCE INDEX OF ADVERTISERS

Containing List of Manufacturers, their Representatives and Useful Literature

ASBESTOS BUILDING LUMBER

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

J. A. Drummond, 245 Mission Street, San Francisco, Cal.
Illustrated and descriptive pamphlet, 7¾x10¾, 8 pp. Pamphlet, 4x8½, 8pp. Price list, 3½x6¼. Literature of various sizes, samples, etc. "Service Sheets," working drawings, details of application, size 16½x21½.

ASBESTOS CORRUGATED SHEATING

Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa.

J. A. Drummond, 245 Mission Street, San Francisco, Cal.
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General catalogue "C," 6½x9, 176 pp. Indexed.
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